

3D Digital HD Video Camera Recorder

Operating Guide

Table of contents

Getting started

Recording/Playback

Advanced operations

Saving images with an
external device

Customizing your camcorder

Additional information

Quick reference

NXCAM

AVCHD

HDMI™
HIGH DEFINITION MULTIMEDIA INTERFACE

MEMORY STICK™

InfoLITHIUM™ V
SERIES

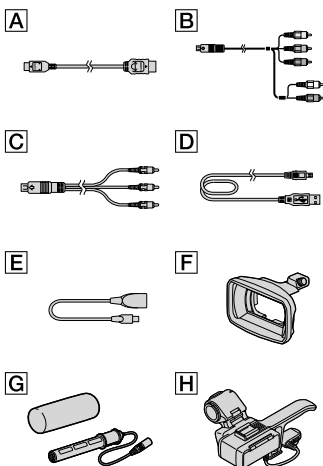
SD XC
CLASS 4

Read this first

Supplied items

The numbers in () are the supplied quantity.

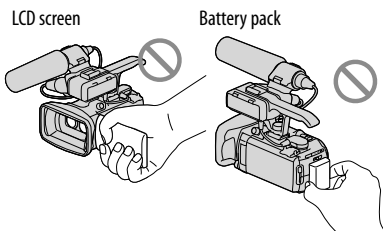
- ☐ Camcorder (1)
- ☐ AC Adaptor (1)
- ☐ Power cord (Mains lead) (1)
- ☐ HDMI cable (1) **[A]**
- ☐ Component A/V cable (1) **[B]**
- ☐ A/V connecting cable (1) **[C]**
- ☐ USB cable (1) **[D]**
- ☐ USB Adaptor Cable (1) **[E]**
- ☐ Lens hood (1) **[F]**
To attach the lens hood, see page 9.
- ☐ Wind Screen (1), Microphone (ECM-XM1) (1) **[G]**
- ☐ XLR Adaptor (1) **[H]**
- ☐ Wireless Remote Commander (1)
A button-type lithium battery is already installed. Remove the insulation sheet before using the Wireless Remote Commander.
- ☐ Rechargeable battery pack NP-FV70 (1)
- ☐ CD-ROM “Content Management Utility” (1)
- ☐ CD-ROM “Manuals for 3D Digital HD Video Camera Recorder” (1)
- ☐ “Operating Guide” (2)



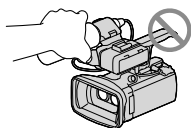
- See page 21 for the memory card you can use with this camcorder.

Using the camcorder

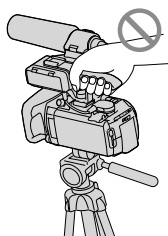
- Do not hold the camcorder by the following parts, and also do not hold the camcorder by the jack covers.



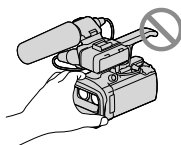
Microphone



XLR Adaptor when a tripod is attached to the camcorder



Lens hood



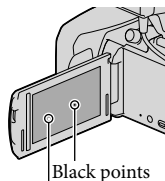
- The camcorder is not dustproofed, dripproofed or waterproofed. See “About handling of your camcorder” (p. 106).

Viewing 3D movies

- You may feel uncomfortable symptoms such as eyestrain, nausea, or a tired feeling while watching 3D movies recorded with the camcorder on 3D compatible monitors. When you watch 3D movies, we recommend that you take a break at regular time intervals. Since the need for or frequency of break times varies between individuals, please set your own standards. If you feel sick, stop watching 3D movies, and consult a doctor as needed. Also, refer to the operating instructions of the connected device or the software used with the camcorder. A child's vision is always vulnerable (especially for children under 6 years of age). Before allowing them to watch 3D movies, please consult with an expert, such as a pediatric or ophthalmic doctor. Make sure your children follow the precautions above.
- The way people perceive 3D movies varies from person to person.

Menu items, LCD panel, and lens

- Avoid operating the touch panel under following conditions, as doing so may cause a malfunction of the camcorder.
 - When there are droplets of water on the touch panel
 - With wet fingers
 - With a pointed object such as pencil, ballpoint pen, nail, etc.
 - Holding the camcorder by grabbing the panel inside the frame
 - With gloves on
- A menu item that is grayed out is not available under the current recording or playback conditions.
- The LCD screen is manufactured using extremely high-precision technology, so over 99.99% of the pixels are operational for effective use. However, there may be some tiny black points and/or bright points (white, red, blue, or green in color) that appear constantly on the LCD screen. These points are normal results of the manufacturing process and do not affect the recording in any way.



White, red, blue or green points

- Exposing the LCD screen or the lens to direct sunlight for long periods of time may cause malfunctions.
- Do not aim at the sun. Doing so might cause your camcorder to malfunction. Take images of the sun only in low light conditions, such as at dusk.

About language setting

- The on-screen displays in each local language are used for illustrating the operating procedures. Change the screen language before using the camcorder if necessary (p. 19).

On recording

- To ensure stable operation of the memory card, it is recommended to format the memory card with your camcorder before the first use (p. 80). Formatting the memory card will erase all the data stored on it and the data will be irrecoverable. Save your important data on your PC etc.
- Before starting to record, test the recording function to make sure the image and sound are recorded without any problems.
- Compensation for the contents of recordings cannot be provided, even if recording or playback is not possible due to a malfunction of the camcorder, recording media, etc.
- TV color systems differ depending on the country/region. To view your recordings on a TV, you need a PAL system-based TV.
- Television programs, films, video tapes, and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the copyright laws.
- Use the camcorder in accordance with local regulations.
- Because of the way that the image device (CMOS sensor) reads out image signals, the following phenomena may occur.
 - The subjects passing by the frame rapidly might appear crooked depending on the recording conditions. (This phenomenon may be notable in displays having high motion resolution.)
 - Horizontal lines appear on the screen during recording under fluorescent lights. The phenomena can be reduced by adjusting the shutter speed (p. 70).
 - Images on the screen look horizontally divided when a subject is lighted with a flash. The phenomena can be reduced by using a slower shutter speed.

Notes on playing back


- You may not be able to play back normally images recorded on your camcorder with other devices. Also, you may not be able to play back images recorded on other devices with your camcorder.

- Standard (STD) image quality movies recorded on SD memory cards cannot be played on AV equipment of other manufacturers.

DVD media recorded with HD image quality (high definition)

- DVD media recorded with high definition image quality (HD) can be played back with devices that are compatible with the AVCHD standard. You cannot play discs recorded with high definition image quality (HD) with DVD players/recorders as they are not compatible with the AVCHD format. If you insert a disc recorded with the AVCHD format (high definition image quality (HD)) into a DVD player/recorder, you may not be able to eject the disc.

Save all your recorded image data

- To prevent your image data from being lost, save all your recorded images on external media periodically. To save images on your computer, see page 59, and to save images on external devices, see page 51.
- 3D movies cannot be saved on a disc. Save them on external media devices (p. 53).
- The type of discs or media on which the images can be saved depend on the [ REC Mode] selected when the images were recorded. Movies recorded with [50p Quality PS] can be saved using external media (p. 53). Movies recorded with [Highest Quality FX] can be saved on external media devices or on Blu-ray discs (p. 39, 53).

Notes on battery pack/AC Adaptor

- Be sure to remove the battery pack or the AC Adaptor after turning off the camcorder.
- Disconnect the AC Adaptor from the camcorder, holding both the camcorder and the DC plug.

Note on the camcorder/battery pack temperature

- When the temperature of the camcorder or battery pack becomes extremely high or extremely low, you may not be able to record or play back on the camcorder, due to the protection features of the camcorder being activated in such situations. In this case, an indicator appears on the LCD screen (p. 94).

When the camcorder is connected to a computer or accessories

- Do not try to format the recording media of the camcorder using a computer. If you do so, your camcorder may not operate correctly.
- When connecting the camcorder to another device with communication cables, be sure to insert the connector plug in the correct way. Pushing the plug forcibly into the terminal will damage the terminal and may result in a malfunction of the camcorder.
- When the camcorder is connected to other devices through a USB connection and the power of the camcorder is turned on, do not close the LCD panel. The image data that has been recorded may be lost.

If you cannot record/play back images, perform [Format]

- If you repeat recording/deleting images for a long time, fragmentation of data occurs on the recording media. Images cannot be saved or recorded. In such a case, save your images on some type of external media first, and then perform [Format] by touching **MENU** (MENU) → [Setup] → [Media Settings] → [Format] → the desired medium → **OK** → **OK**.

Notes on optional accessories

- We recommend using genuine Sony accessories.
- Genuine Sony accessories may not be available in some countries/regions.

About this manual, illustrations and on-screen displays

- In this manual, the **3D** and **2D** icons indicate the 3D and 2D sides of the 2D/3D switch, respectively.
- The example images used in this manual for illustration purposes are captured using a digital still camera, and therefore may appear different from images and screen indicators that actually appear on your camcorder. And, the illustrations of your camcorder and its screen indication are exaggerated or simplified for understandability.
- In this manual, the internal memory and the memory card are called “recording media.”
- In this manual, the DVD disc recorded with high definition image quality (HD) is called AVCHD recording disc.
- Design and specifications of your camcorder and accessories are subject to change without notice.

Notes on use



- Do not do any of the following. Otherwise, the recording media may be damaged, recorded images may be impossible to play back or may be lost, or other malfunctions could occur.
 - ejecting the memory card when the access lamp (p. 22) is lit or flashing
 - removing the battery pack or AC Adaptor from the camcorder, or applying mechanical shock or vibration to the camcorder when the  (Movie)/ (Photo) lamps (p. 24) or the access lamp (p. 22) are lit or flashing
- When using a shoulder belt (sold separately), do not crash the camcorder against an object.

Table of contents

3D and **2D** indicate the 3D and 2D sides of the 2D/3D switch (p. 24), respectively.
The items you can set differ depending on the position of the switch.

Read this first	2
Notes on use	5

Getting started

Step 1: Attaching the supplied microphone and lens hood	9
Attaching the XLR Adaptor	9
Attaching the microphone	10
Attaching the lens hood	11
Step 2: Charging the battery pack	13
Step 3: Turning the power on, and setting the date and time	16
Changing the language setting	19
Step 4: Preparing the recording media	20
Selecting recording media	20
Inserting a memory card	21

Recording/Playback

Recording	23
Recording movies	24
Shooting photos	27
Playback on the camcorder	28
Operating the camcorder while playing a movie	30
Adjusting the depth of 3D movies	30
Viewing photos	31
Playing images on a TV	32
List of connection	32
Using "BRAVIA" Sync	34

Advanced operations







Useful functions for recording movies and photos	36
Zooming	36
Recording better images automatically (Intelligent Auto)	37
Selecting high definition image quality (HD) or standard image quality (STD)	37
Selecting the frame rate	38

Selecting the recording mode	38
Using the Tracking focus function.....	39
Recording high quality photos during movie recording (Dual Rec).....	40
Recording in mirror mode	40
Controlling the image settings manually with the MANUAL dial	40
Setting time data	42
Audio setup	43
Select the method for inputting sound	43
Using the internal microphone	43
Using an external microphone (sold separately)	43
Using the supplied microphone	43
Adjusting the recording level	44
Reducing wind noise	45
Using an external audio device	45
Making good use of your camcorder	46
Deleting images	46
Protecting recorded movies and photos (Protect)	47
Copying images.....	48
Dividing a movie.....	49
Capturing a photo from a movie	50


Saving images with an external device

Selecting a method for saving images with an external device	51
The devices on which the created disc can be played back.....	52
Saving images on an external media device	53
Saving desired movies and photos	55
Playing back images in the external media device on the camcorder	55
Creating a high definition image quality (HD) disc with a DVD writer, etc., other than DVDirect Express.....	56
Creating a standard definition image quality (STD) disc with a recorder, etc.	57
Saving images with a computer	59
Step 1 Checking the computer system.....	59
Step 2 Installing the supplied software "Content Management Utility"	59

Customizing your camcorder

Using menus	62
Operating menus	62
Menu lists	63
 Shooting Mode (Items for selecting a shooting mode)	67
 Camera/Mic (Items for customized shooting)	68
 Image Quality/Size (Items for setting up image quality or size)	77
 TC/UB (Items for setting up the time code or user bit)	79
 Edit/Copy (Items for editing)	80
 Setup (Other setup items)	80

Additional information

 Troubleshooting	87
Self-diagnosis display/Warning indicators	94
Recording time of movies/number of recordable photos	97
Expected time of recording and playback with each battery pack	97
Expected recording time of movies	98
Expected number of recordable photos	99
Using your camcorder abroad	101
File/folder structure on the recording media	103
Maintenance and precautions	104
About the AVCHD format	104
About the memory card	104
About the "InfoLITHIUM" battery pack	105
About x.v.Color	106
About handling of your camcorder	106
Specifications	109

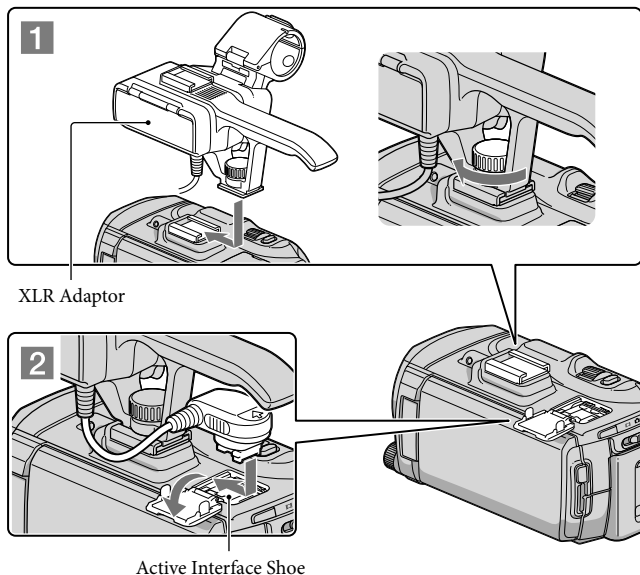
Quick reference

Screen indicators	113
Parts and controls	114
Index	119

Step 1: Attaching the supplied microphone and lens hood

You do not need to attach the XLR Adaptor or microphone when you use the internal microphone.

Attaching the XLR Adaptor



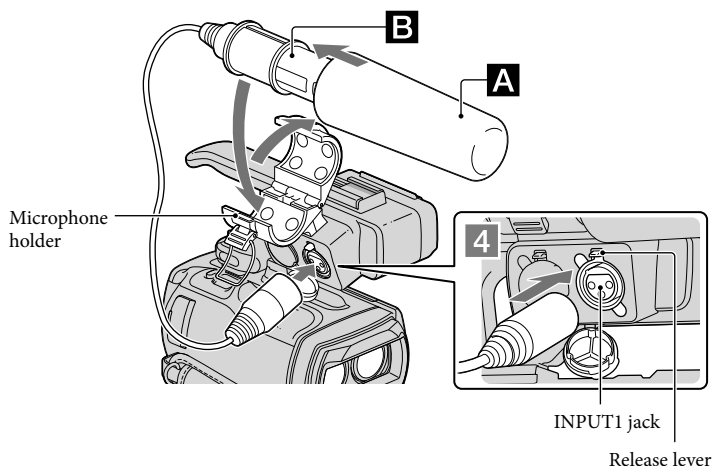
1 Attach the XLR Adaptor to the accessory shoe on the camcorder and tighten the screw of the XLR Adaptor.

2 Connect the plug of the XLR Adaptor to the Active Interface Shoe of the camcorder.

When detaching the XLR Adaptor

Unplug the connector plug of the XLR Adaptor from the Active Interface Shoe beforehand. Detach the XLR Adaptor after having loosened the screw of the XLR Adaptor.

Attaching the microphone



1 Attach the wind screen **A** to the microphone **B**.

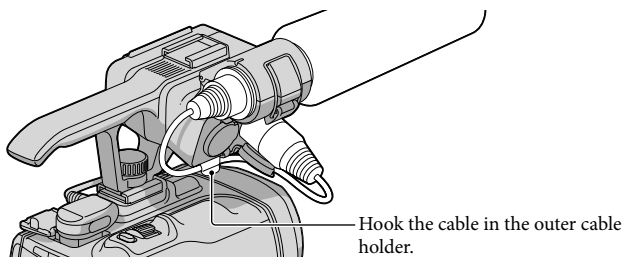
2 Unlock the stopper of the microphone holder and open the cover.

3 Align the convex part of the microphone with the concave part of the holder, and then place the microphone into the holder. Close the cover and lock the stopper securely.

Be sure to place the microphone with the model name (ECM-XM1) facing upward.

4 Connect the plug of the microphone to the INPUT1 connector of the XLR Adapter.

- 5** Put the microphone cable into the cable holder.

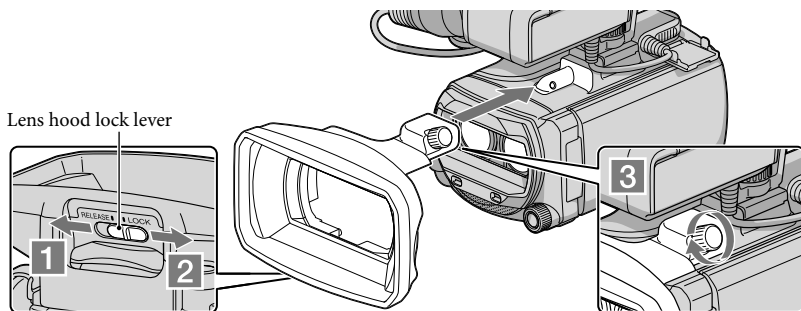


See page 43 on the settings for the audio recording.

When detaching the microphone cable

- ① Detach the microphone from the microphone holder.
- ② Unplug the microphone plug while pressing the release lever down.

Attaching the lens hood



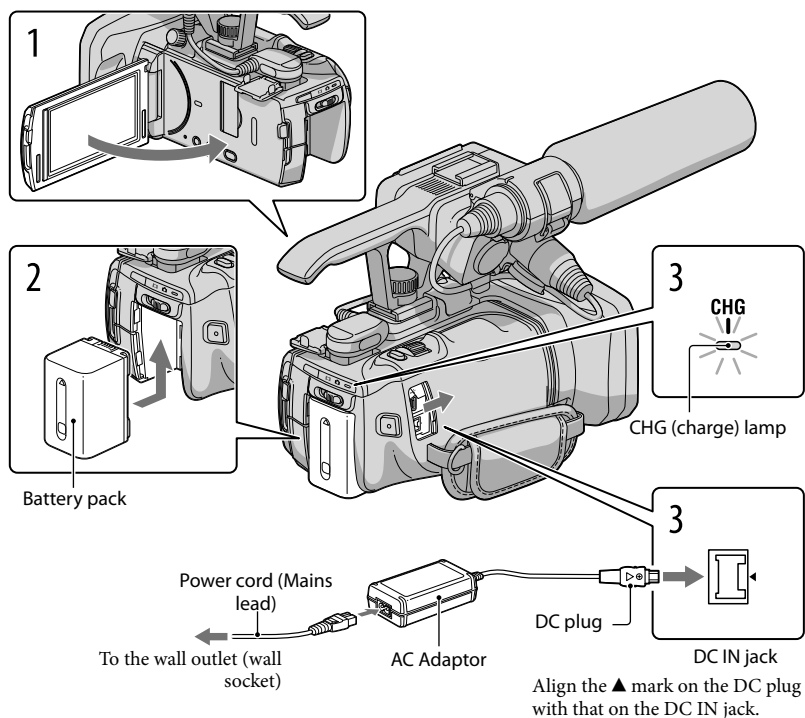
- 1** Move the lens hood lock lever at the bottom of the lens hood to RELEASE (default setting).
- 2** Attach the lens hood to the camcorder and move the lens hood lock lever to LOCK.

3 Tighten the screw of the lens hood firmly.

To remove the lens hood

Loosen the screw of the lens hood and remove the lens hood while moving the lens hood lock lever to RELEASE.

Step 2: Charging the battery pack



You can charge the "InfoLITHIUM" battery pack (V series) after attaching it to your camcorder.

⚡ Notes

- You cannot attach any "InfoLITHIUM" battery pack other than the V series to your camcorder.

1

Turn off your camcorder by closing the LCD screen.

2

Attach the battery pack by sliding it in the direction of the arrow until it clicks.

3 Connect the AC Adaptor and the power cord (mains lead) to your camcorder and the wall outlet (wall socket).

The CHG (charge) lamp lights up and charging starts. The CHG (charge) lamp turns off when the battery pack is fully charged.

4 When the battery is charged, disconnect the AC Adaptor from the DC IN jack of your camcorder.

Charging time

Approximate time (min.) required when you fully charge a fully discharged battery pack.

Battery pack	Charging time
NP-FV50	155
NP-FV70 (supplied)	195
NP-FV100	390

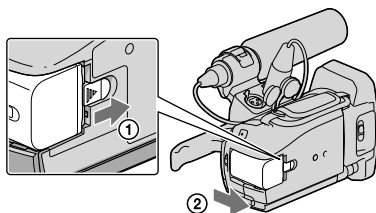
- The charging times shown in the table above are measured when charging the camcorder at a temperature of 25 °C (77 °F). It is recommended that you charge the battery in a temperature range of 10 °C to 30 °C (50 °F to 86 °F).

Tips

- See page 97 on recording and playing time.
- When your camcorder is on, you can check the approximate amount of remaining battery power with the remaining battery indicator at the upper right on the LCD screen.

To remove the battery pack

Close the LCD screen. Slide the BATT (battery) release lever (①) and remove the battery pack (②).



To use a wall outlet (wall socket) as a power source

Make the same connections as “Step 2: Charging the battery pack” (p. 13). Even if the battery pack is attached, the battery pack is not discharged.



Charging the battery pack abroad

You can charge the battery pack in any countries/regions using the AC Adaptor supplied with your camcorder within the AC 100 V - 240 V, 50 Hz/60 Hz range.

Notes

- Do not use an electronic voltage transformer.

Notes on the battery pack

- When you remove the battery pack or disconnect the AC Adaptor, turn the camcorder off and make sure that the  (Movie)/ (Photo) lamps (p. 24), the access lamp (p. 22) are turned off.
- The CHG (charge) lamp flashes during charging under the following conditions.
 - The battery pack is not attached correctly.
 - The battery pack is damaged.
 - The temperature of the battery pack is low.
Remove the battery pack from your camcorder and put it in a warm place.
 - The temperature of the battery pack is high.
Remove the battery pack from your camcorder and put it in a cool place.
- We do not recommend using an NP-FV30, which only allows short recording and playback times, with your camcorder.

Notes on the AC Adaptor

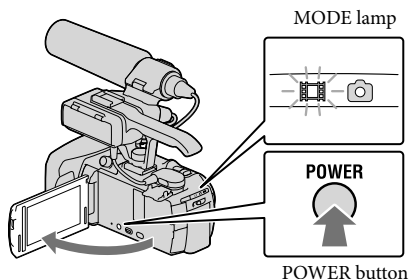
- Use the nearby wall outlet (wall socket) when using the AC Adaptor. Disconnect the AC Adaptor from the wall outlet (wall socket) immediately if any malfunction occurs while using your camcorder.
- Do not use the AC Adaptor placed in a narrow space, such as between a wall and furniture.
- Do not short-circuit the DC plug of the AC Adaptor or battery terminal with any metallic objects. This may cause a malfunction.

Step 3: Turning the power on, and setting the date and time

1 Open the LCD screen of your camcorder.

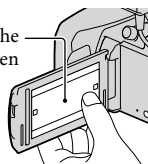
Your camcorder is turned on.

- To turn on your camcorder when the LCD screen is open, press POWER.

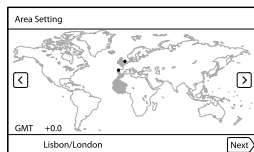


2 Select the desired language, then touch [Next].

Touch the button on the LCD screen

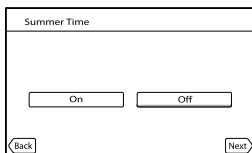


3 Select the desired geographical area with ◀/▶, then touch [Next].

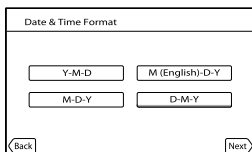


4 Set [Summer Time], then touch [Next].

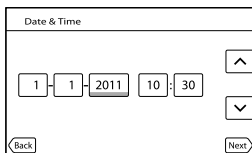
- If you set [Summer Time] to [On], the clock advances 1 hour.



5 Select the date format, then touch [Next].



6 Select the date and time, touch / to set the value, then touch [Next] → .

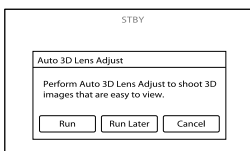


The clock starts.

- To set the date and time again, touch (MENU) → [Setup] → (Clock Settings) → [Date & Time Setting] → [Date & Time]. When an item is not on the screen, touch / until the item appears.

7 Touch [Run].

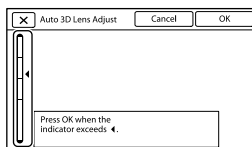
- If you touch [Run Later], the recording mode screen appears. When you turn on the camcorder next time, the [Auto 3D Lens Adjust] screen will appear.



8

Aim the camcorder at a subject to display it on the LCD screen.

- Be sure that the subject produces a scale higher than the ◀ mark. The subject will appear doubled. If you feel uncomfortable viewing the image in 3D, press 2D/3D DISP and check the image in 2D (p. 24).



Scale

9

Touch **OK**.

- The camcorder automatically zooms in or out to adjust the lenses. Do not change the subject until the adjustment is completed.

⚡ Notes

- If [Could not adjust.] appears, touch [Run Again].
- If the 2D/3D switch (p. 24) is set to 2D, the [Auto 3D Lens Adjust] screen does not appear.

Type of subjects that should be displayed on the LCD screen for [Auto 3D Lens Adjust]

The scale indicated varies depending on the subject displayed on the LCD screen.

Subjects that indicate a higher scale:

- Bright subjects, such as objects outdoors in daylight
- Subjects with various colors and shapes



Subjects that indicate a lower scale and result in adjustment failure:

- Dark subjects, such as objects viewed at night
- Subjects within 2 m (6 ft. 6 3/4 in.) away from the camcorder
- Plain, non-colorful subjects
- Subjects that repeat the same pattern, such as rows of windows on buildings
- Moving subjects




⚡ Notes

- The date and time does not appear during recording, but they are automatically recorded on the recording media, and can be displayed during playback. To display the date and time, touch **MENU** (MENU) → [Setup] → [▶] (▶ Playback Settings) → [Data Code] → [Date/Time] → **OK**.

To turn off the power

Close the LCD screen.

The  (Movie) lamp flashes for a few seconds and the camcorder is turned off.

💡 Tips

- You can turn off the camcorder also by pressing POWER.
- When [Power On By LCD] (p. 85) is set to [Off], turn off your camcorder by pressing POWER.

Changing the language setting

You can change the on-screen displays to show messages in a specified language.

Touch **MENU** (MENU) → [Setup] → [] (General Settings) → [Language Setting] → a desired language → **OK** → **X** → **X**.

Step 4: Preparing the recording media

The recording media that can be used are displayed on the screen of your camcorder as following icons.



Internal memory





Memory card

* In the default setting, both movies and photos are recorded on this recording media. You can perform recording, playback and editing operations on the selected medium.

Tips

- See page 98 for the recordable time of movies.
- See page 99 for the number of recordable photos.

Selecting recording media

- 1 Touch **MENU** (MENU) → [Setup] → [ ( Media Settings)] → [Media Select].

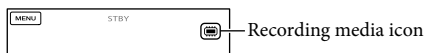
The [Media Select] screen appears.

- 2 Touch the desired recording medium → **OK** → **OK**.

Both movies and photos are recorded on the selected medium.

To check the recording media settings

In either movie recording mode or photo recording mode, the media icon of the selected recording media is displayed at the top right corner of the screen.


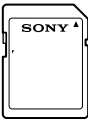


Inserting a memory card

Notes

- Set the recording medium to [Memory Card] to record movies and/or photos on a memory card.

Types of memory card you can use with your camcorder

		SD Speed Class	Described in this manual
“Memory Stick PRO Duo” media (Mark2)		—	“Memory Stick PRO Duo” media
“Memory Stick PRO-HG Duo” media			
SD memory card		Class 4 or faster	SD card
SDHC memory card			
SDXC memory card			

- Operation with all memory cards is not assured.
- “Memory Stick PRO Duo” media, half the size of “Memory Stick”, or standard size SD cards can be used for this camcorder.
- Do not attach a label or the like on memory card or memory card adaptor. Doing so may cause a malfunction.
- “Memory Stick PRO Duo” media of up to 32 GB and SD cards of up to 64 GB have been verified to operate with your camcorder.

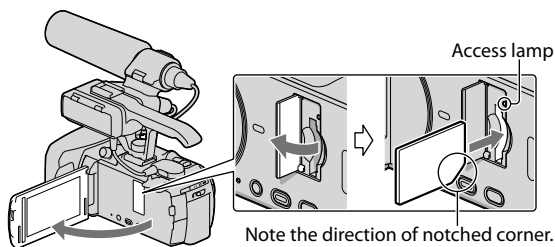
Notes

- A MultiMediaCard cannot be used with this camcorder.
- Movies recorded on SDXC memory cards cannot be imported to or played back on computers or AV devices not supporting the exFAT* file system by connecting the camcorder to these devices with the USB cable. Confirm in advance that the connecting equipment is supporting the exFAT system. If you connect an equipment not supporting the exFAT system and the format screen appears, do not perform the format. All the data recorded will be lost.

* The exFAT is a file system that is used for SDXC memory cards.

1 Open the cover, and insert the memory card with the notched edge in the direction as illustrated until it clicks.

- Close the cover after inserting the memory card.



The [Preparing image database file. Please wait.] screen appears if you insert a new memory card. Wait until the screen disappears.

2 Close the cover.

⚡ Notes

- If [Failed to create a new Image Database File. It may be possible that there is not enough free space.] is displayed, format the memory card (p. 80).
- Confirm the direction of the memory card. If you forcibly insert the memory card in the wrong direction, the memory card, memory card slot, or image data may be damaged.
- Do not open the cover during recording.
- When inserting or ejecting the memory card, be careful so that the memory card does not pop out and drop.

To eject the memory card

Open the cover and lightly push the memory card in once.

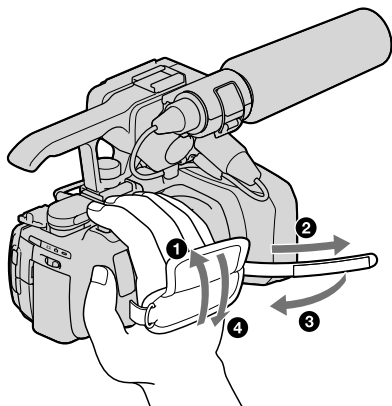
Recording

In the default setting, movies and photos are recorded on the internal recording media. Movies are recorded in 3D with high definition image quality (HD).

Tips

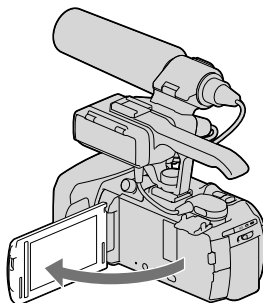
- To change the recording media, see page 20.

1 Fasten the grip belt.

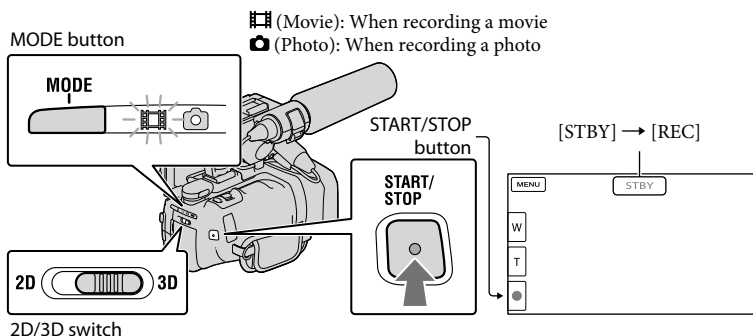


Recording/Playback

2 Open the LCD screen of your camcorder. Your camcorder is turned on.



Recording movies



1 Press MODE to turn on the (Movie) lamp.

2 Press START/STOP to start recording.

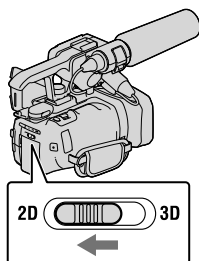
To stop recording, press START/STOP again.

Tips

- Shoot the subject from about 80 cm to 6 m (3 ft. to 20 ft.) away to obtain good 3D movies. The distance varies when you use zooming (p. 36).

To record 2D movies

Set the 2D/3D switch to 2D.

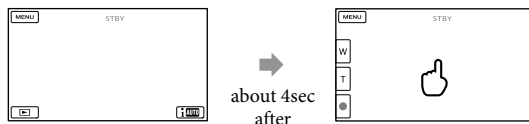


Notes

- Do not operate the 2D/3D switch during recording. The camcorder stops recording.

To display items on the LCD screen again

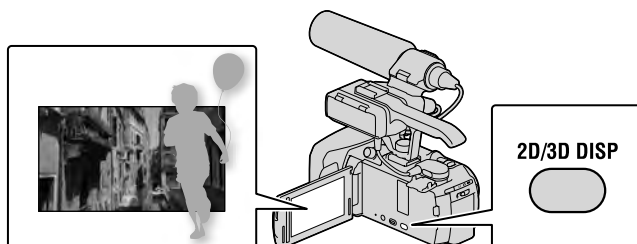
Touch anywhere on the screen except the buttons on the LCD screen so that you can use items. You can change the settings using the [Display Setting] menu (p. 76).



To record movies in 3D while viewing them in 2D on the LCD screen of the camcorder

If you record 3D movie for a long time, you may feel uncomfortable. Press 2D/3D DISP to switch the image from 3D to 2D. The image appears in 2D, but the camcorder continues recording in 3D.

When the screen is switched from 2D to 3D, the screen becomes darker. This is not a malfunction.

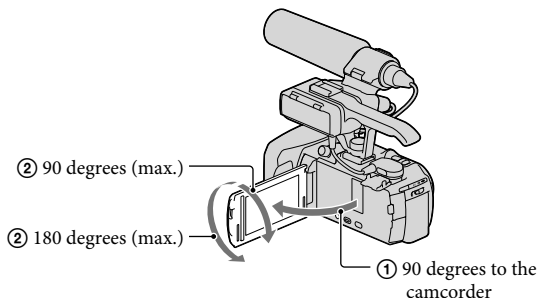


⚡ Notes

- If you close the LCD screen while recording movies, the camcorder stops recording.
- The maximum continuous recordable time of movies is as follows.
 - 3D: about 6 hours 30 minutes
 - 2D: about 13 hours
- When a movie file exceeds 2 GB, the next movie file is created automatically.
- It will take several seconds until you can start recording after you turn on the camcorder. You cannot operate your camcorder during this time.
- The following states will be indicated if data is still being written onto the recording media after recording has finished. During this time, do not apply shock or vibration to the camcorder, or remove the battery or AC Adaptor.
 - Access lamp (p. 22) is lit or flashing
 - The media icon in the upper right of the LCD screen is flashing

Tips

- See page 98 on the recordable time of 2D movies.
- You can record photos during movie recording by pressing PHOTO fully (Dual Rec, p. 40).
- [SteadyShot] is set to [Active] in the default setting.
- You can specify the priority face by touching it (p. 39).
- You can capture photos from recorded 2D movies (p. 50).
- You can check the recordable time, estimated remaining capacity, etc., by touching **MENU** (MENU) → [Setup] → [Media Settings] → [Media Info].
- The LCD screen of your camcorder can display recording images across the entire screen (full pixel display). However, this may cause slight trimming of the top, bottom, right and left edges of images when played back on a TV which is not compatible with full pixel display. In the case of 2D recording, set [Guide Frame] to [On] (p. 76), and record images using the outer frame displayed on the screen as a guide.
- To adjust the angle of the LCD panel, first open the LCD panel 90 degrees to the camcorder (①), and then adjust the angle (②).

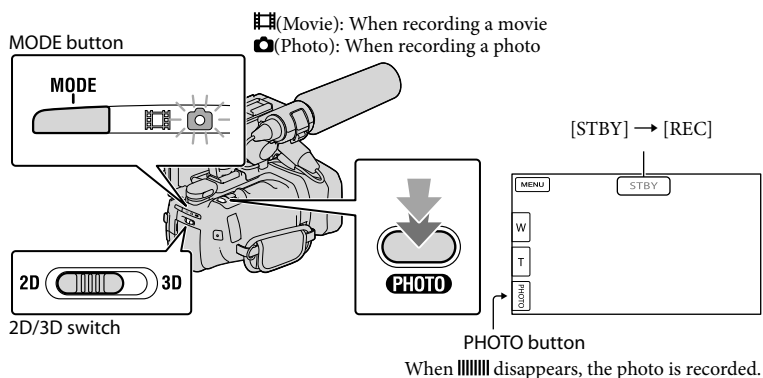


- Watch 3D movies on the LCD screen squarely from about 30 cm (11 7/8 in.) away.

Data code during recording

The recording date, time and condition are recorded automatically on the recording media. They are not displayed during recording. However, you can check them as [Data Code] during playback. To display them, touch **MENU** (MENU) → [Setup] → [Play] (▶) [Playback Settings] → [Data Code] → a desired setting → **OK** → **OK**.

Shooting photos



1 Set the 2D/3D switch to 2D.

2 Press MODE to turn on the (Photo) lamp.

The LCD screen display switches for photo recording mode, and the screen aspect ratio becomes 4:3.

3 Press PHOTO lightly to adjust the focus, then press it fully.

Note

- You cannot shoot photos in 3D.

Tips

- To change the image size, touch **MENU** (MENU) → [Image Quality/Size] → [Image Size] → a desired setting → **OK**.
- You cannot record photos while is displayed.

Playback on the camcorder

You can enjoy the playback of images with powerful sound through the stereo speakers built into the camcorder.

In the default setting, movies and photos that are recorded on the internal recording media are played.

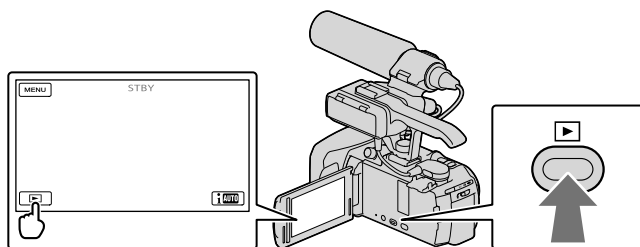
Tips

- To change the recording media, see page 20.
- The camcorder displays recorded images as an event automatically, based on the date and time.
- To play back 2D movies, set the 2D/3D switch to 2D.

1 Open the LCD screen of your camcorder.

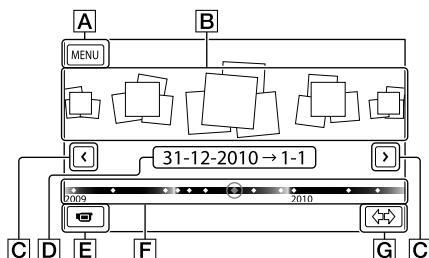
Your camcorder is turned on.







2 Press (View Images).



The Event View screen appears after some seconds.

3 Touch / to select the desired event ().



-  To the MENU screen
-  Events
-   /  : To the previous/next event
-  Event name

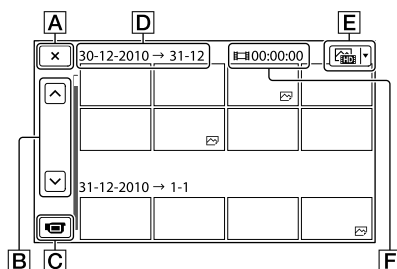
E Change to the movie/photo recording mode

F Time-line bar

G Change Event Scale button

- The Event Index screen appears when you touch the event that is displayed on the center.
- You can also choose an event by touching on **D** the time-line bar.
- Touch **G** (Change Event Scale button **G**) on the bottom right of the screen so that you can change the time range of the time-line bar from one and a half years to 3 months, which changes the number of the events that can be displayed on the time-line bar.

4 Touch an image you want to view.



A To go back to the Event View screen

B Displays the previous/next page (Touching and holding the button scrolls the index screen.)

C Changes to the movie/photo recording mode

D Event title

E Switch Image Type button (2D only)

F Total playing time of movies in the event.

- Touch **E** to select the image type to be displayed in the index from [**MOVIE**] (movies only), [**PHOTO**] (photos only), or [**MOVIE/PHOTO**] (movies and photos mixed). When [**PHOTO**] (photos only) is selected, total number of photos in the event is displayed in **F**.
- **▶** appears with the movie or photo that was most recently played or recorded. If you touch the movie or photo with **▶**, you can continue playback from the previous time.

Notes

- If you operate the 2D/3D switch, the recording mode screen appears. Do not operate the 2D/3D switch during playback.

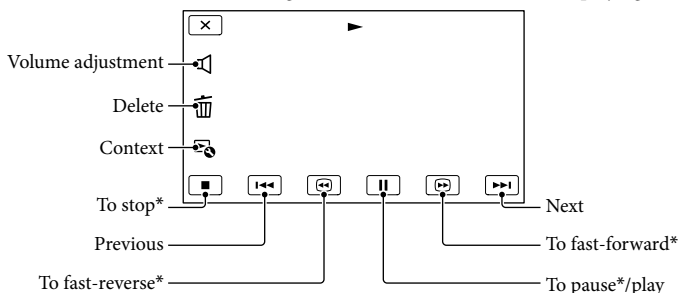
Tips

- When the 2D/3D switch is set to 3D, only 3D movies are played back. When the switch is set to 2D, both 3D and 2D images are played back in 2D.
- You can view 3D movies in 2D by pressing 2D/3D DISP (p. 25).

Operating the camcorder while playing a movie

3D 2D

You can use the functions shown in the figure below while the camcorder is playing a movie.



* These buttons can be used only when the camcorder is playing a movie.

Notes

- You may not be able to play back the images with other devices than camcorder.

Tips

- The above figure appears also when you select [MOVIE/PHOTO] by touching the Switch Image Type button on the Even Index screen (2D only).
- Touching [] on the playback screen displays functions you can currently use, and allows you to use those functions easily.
- When playback from the selected image reaches the last image, the screen returns to the INDEX screen.
- Touch [] during pause to play back movies slowly.
- As you repeat touching [] / [] during playback, movies are played as fast as about 5 times → about 10 times → about 30 times → about 60 times.
- The recording date, time, and shooting conditions are recorded automatically during recording. This information is not displayed during recording, but you can display it during playback by touching [MENU] → [Setup] → [] ([] Playback Settings) → [Data Code] → a desired setting → [OK] → [X].

To adjust the sound volume of movies

While playing back movies, touch [] → adjust with [] / [] → [X].

Adjusting the depth of 3D movies

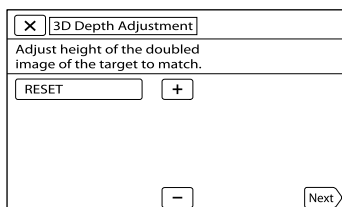
3D

You can adjust the depth while playing back 3D movies.

- 1 Touch [] → [3D Depth Adjustment] on the 3D movie playback screen.

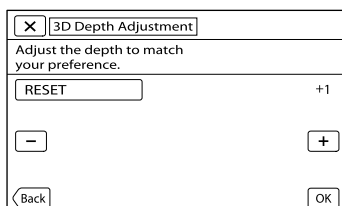
The movie stops and the screen used to adjust the vertical direction appears.

- 2 Touch **+**/**-** to adjust the vertical direction → [Next].



The screen used to adjust horizontal direction appears.

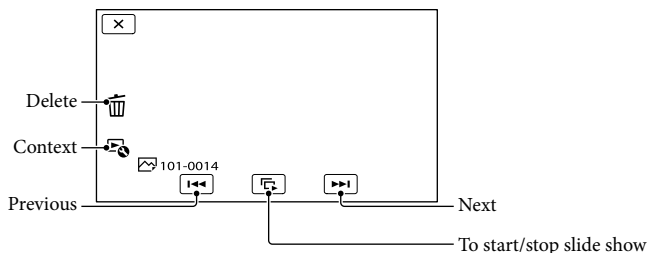
- 3 Touch **+**/**-** to adjust the horizontal direction → **OK**.



Viewing photos

2D

You can use the functions shown in the figure below while you are viewing photos. The figure below will be displayed when you select [PHOTO] by touching the Switch Image Type button on the Event Index screen.



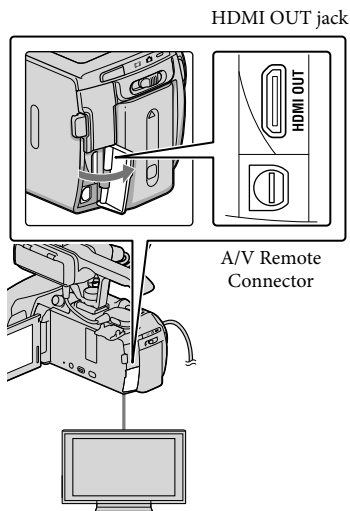
Tips

- To repeat Slideshow, touch → [Slideshow Set].

Playing images on a TV

Connection methods, the image type (3D or 2D) and the image quality (high definition (HD) or standard definition (STD)) viewed on the TV screen differ depending on what type of TV is connected, and the connectors used.

Output connectors on the camcorder

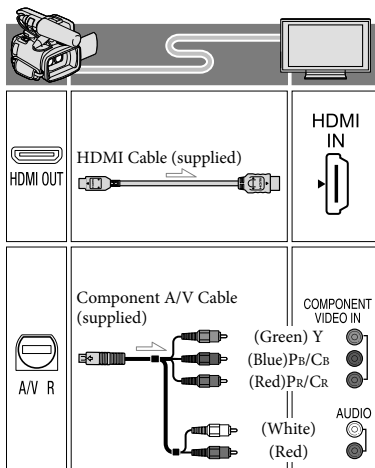


- 1 Switch the input on the TV to the connected jack.
 - Refer to the instruction manuals of the TV.
- 2 Connect the camcorder to a TV.
 - Use the supplied AC Adaptor as the power source (p. 15).
- 3 Play a movie or a photo on the camcorder (p. 28).

List of connection

Connecting to a 3D TV

Make sure that the 2D/3D switch of the camcorder is set to 3D.

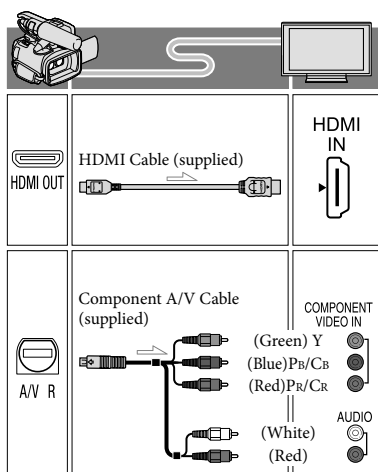


Notes

- When the TV is connected with a component A/V cable (supplied), 3D movies are displayed in 2D.

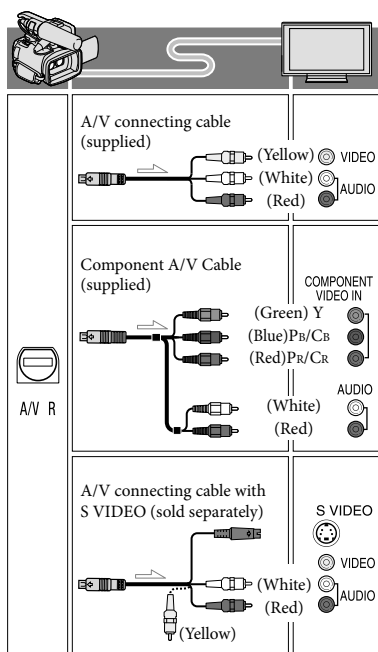
Connecting to a high definition TV

When the recording quality is high definition image quality (HD), the movies are played back in high definition image quality (HD). When the recoding quality is standard image quality (STD), the movies are played back in standard definition image quality (STD).



Connecting to a non-high-definition 16:9 (wide) or 4:3 TV

When movies are recorded with high definition image quality (HD), they are played back in standard definition image quality (STD). When movies are recorded with standard image quality (STD), they are played back in standard definition image quality (STD).



When you connect with HDMI cable

- Use an HDMI cable with the HDMI logo.
- Use an HDMI mini connector on one end (for the camcorder), and a plug suitable for connecting your TV on the other end.
- Copyright-protected images are not output from the HDMI OUT jack of your camcorder.
- Some TVs may not function correctly (e.g., no sound or image) with this connection.
- Do not connect the camcorder HDMI OUT jack to an external device HDMI OUT jack, as malfunction may result.

When you connect with component A/V cable

- If you connect only component video plugs, audio signals are not output. Connect the white and red plugs to output audio signals.
- Select the [Component] setting for the component input jack you are using.
Touch **MENU** (MENU) → [Setup] → [↔] (↔ Connection) → [Component] → a desired setting → **OK** to make the setting.

To set the aspect ratio according to the connected TV (16:9/4:3)

- Set [TV Type] to [16:9] or [4:3] according to your TV (p. 82).

When you connect with A/V connecting cable with S-Video

- When the S VIDEO plug (S VIDEO channel) is connected, audio signals are not output. To output audio signals, connect the white and red plugs to the audio input jack of your TV.
- This connection produces higher resolution images compared with the A/V connecting cable.

When your TV is monaural (When your TV has only one audio input jack)

- Connect the yellow plug of the A/V connecting cable to the video input jack and connect the white (left channel) or red (right channel) plug to the audio input jack of your TV or VCR.

When connecting to your TV via a VCR

- Connect your camcorder to the LINE IN input on the VCR using the A/V connecting cable. Set the input selector on the VCR to LINE (VIDEO 1, VIDEO 2, etc.).

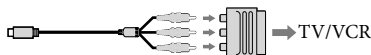
⚡ Notes

- When you play back standard definition image quality (STD) movies on a 4:3 TV that is not compatible with the 16:9 signal, record movies with 4:3 aspect ratio. Touch **MENU** (MENU) → [Image Quality/Size] → [4:3] → **OK** (p. 77).

- When the A/V connecting cable is used to output movies, movies are output with standard definition image quality (STD).

If your TV/VCR has a 21-pin adaptor (EUROCONNECTOR)

Use a 21-pin adaptor (sold separately) to view playback pictures.



💡 Tips


- If you connect your camcorder to the TV using more than one type of cable to output images, the order of priority of the TV input jacks is as follows:
HDMI → component → S VIDEO → video
- HDMI (High Definition Multimedia Interface) is an interface to send both video/audio signals. The HDMI OUT jack outputs high quality images and digital audio.

Using "BRAVIA" Sync

You can operate your camcorder with the remote commander of your TV by connecting your camcorder to a "BRAVIA" Sync compatible TV launched in 2008 or later with the HDMI cable.

You can operate the menu of your camcorder by pressing the SYNC MENU button of the remote commander of your TV. You can display the camcorder screens such as Event View, play selected movies or display selected photos by pressing up/down/left/right/enter buttons of the remote commander of your TV.

Notes


- There may be some operations you cannot do with the remote commander.
- To set your camcorder, touch **MENU** (MENU) → [Setup] → [ Connection] → [CTRL FOR HDMI] → [On] (the default setting) → **OK** → **X**.
- Also set your TV accordingly. Refer to the instruction manual of the TV for details.
- The operation of "BRAVIA" Sync differs according to each model of BRAVIA. Refer to the instruction manual of your TV for details.

Tips

- If you turn off the TV, your camcorder is turned off simultaneously.

On "Photo TV HD"

This camcorder is compatible with the "Photo TV HD" standard. "Photo TV HD" allows for highly-detailed, photo-like depiction of subtle textures and colors. By connecting Sony's Photo TV HD-compatible devices using the HDMI cable* or a component AV cable**, a whole new world of photos can be enjoyed in breathtaking full HD quality.

- * The TV will automatically switch to the appropriate mode when [ PHOTO] is selected with the Switch Image Type button.
- ** Setup of the TV will be necessary. Please refer to the instructions of your Photo TV HD-compatible TV for details.

Useful functions for recording movies and photos

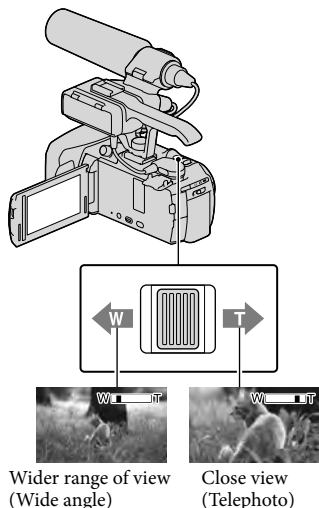
The **3D** and **2D** icons indicate the 3D and 2D positions of the 2D/3D switch (p. 24), respectively.

Zooming

3D **2D**

You can magnify images with the power zoom lever. Magnifications available are as follows. You can magnify images also with the / on the LCD screen.

- 3D recording: 10 times the original size
- 2D recording: 17 times the original size



Wider range of view
(Wide angle)

Close view
(Telephoto)

Move the power zoom lever slightly for a slower zoom. Move it further for a faster zoom.

Optimum distance from the subject and zooming level

The distance at which you can obtain good 3D movies varies depending on the zooming level.

Distance from the subject	Zoom
about 80 cm to 6 m (3 ft. to 20 ft.)	W T
about 2.5 m to 10 m (8 ft. to 32 ft.)	W T
about 7.5 m to 20 m (25 ft. to 65 ft.)	W T

Notes

- If the movies appear doubled on the LCD screen, return the zoom to the original level.
- A subject within 80 cm (about 3 ft.) away should be recorded in 2D.
- You cannot change the zoom speed with the / button on the LCD screen.
- The minimum possible distance between camcorder and subject while maintaining sharp focus is about 1 cm (about 13/32 in.) for wide angle and about 80 cm (about 3 ft.) for telephoto (2D mode only).
- You can magnify images using optical zooming, unless SteadyShot is set to [Active]. Magnifications available are as follows.
 - 3D recording: 10 times
 - 2D recording: 12 times

Tips

- You can set [Digital Zoom] if you want to zoom to a greater level (p. 74) (2D mode only).

Recording better images automatically (Intelligent Auto) **3D 2D**

When you turn the camcorder toward the subject, the camcorder records using the optimum combination of the 3 detection modes: Face detection, Scene detection and Camera-shake detection ([On] is the default setting). When the camcorder detects the subject, the icons that correspond to the detected condition are displayed.

- 1 Touch **ⓘ** at the right bottom on the recording screen of movies or photos.



- 2 Touch **→ [On] → OK**.

Face detection

Ⓐ (Portrait), **👶** (Baby)

The camcorder detects faces, and adjusts the focus, color, and exposure.

Scene detection

🌅 (Backlight), **🏔️** (Landscape), **🌙** (Twilight), **🔦** (Spotlight), **💡** (Low light), **🌺** (Macro)

The camcorder selects the most effective setting automatically, depending on the scene.

Camera-shake detection

🚶 (Walk), **🪜** (Tripod)

The camcorder detects whether camera-shake occurs or not, and makes the optimum compensation.

📌 Notes

- The camcorder may not detect the expected scene or subject, depending on the recording conditions.

Selecting high definition image quality (HD) or standard image quality (STD) **2D**

You can select the desired image quality from the high definition image quality (HD) that enables you to record fine images, or the standard definition image quality (STD) that has more compatibility with various playback devices ([**HD** HD Quality] is the default setting). Change the image quality according to the recording situation or the playback device.

- 1 Touch **MENU** (MENU) → [Image Quality/Size] → [**HD** / **STD** Setting].
- 2 Touch [**HD** HD Quality] to record high definition image quality (HD) images, or touch [**STD** STD Quality] to record standard definition image quality (STD) images.

- 3 Touch **OK** → **OK**.

Recording image quality is changed.



Tips

- You can record, play, or edit movies in the selected image quality only. To record, play, or edit movies in another image quality, change this setting.

Selecting the frame rate

3D 2D

You can select the frame rate to be used to record high definition image quality (HD) movies. Using [50i] is recommended for standard recording. When record 2D movie, set [2D Frame Rate] first, before setting [REC Mode] (p. 38).

1 Touch **MENU** (MENU) → [Image Quality/Size] → [3D Frame Rate]/[2D Frame Rate].

2 Touch the desired setting, then touch [Next].

3 Touch the desired recording mode.

4 Touch **OK**.

Frame rate/Scan System

- 50p: 50 progressive
- 50i: 50 interlace
- 25p: 25 progressive



Tips

- Frame rate means the number of images that are updated in a certain period of time.
- When 2D recording and [60i/50i Sel] is set to [60i], you can select [2D Frame Rate] from [60p], [60i] and [24p] to be used to record high definition image quality (HD) movies.



Notes

- When 3D recording and [60i/50i Sel] is set to [50i], you cannot select the frame rate.

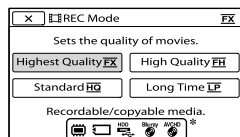
Selecting the recording mode

2D

You can switch the recording mode to select the movie quality when recording high definition image quality (HD) movies ([Highest Quality **FX**] is the default setting). The recording time of the recording media is changed depending on the recording mode.

1 Touch **MENU** (MENU) → [Image Quality/Size] → [REC Mode].

2 Touch the desired recording mode.



The recording modes available will depend on the selected [3D Frame Rate]/[2D Frame Rate] (p. 77).

- * appears on a medium icon if a movie recorded with the selected recording mode cannot be saved on that medium.

3 Touch **OK**.

Recording modes and the media

Types of media that images can be saved on will depend on the recording mode selected.

For details on a save operation using the external devices, see page 51.

Types of media	Recording mode			
	3D	PS*	FX	FH/ HQ/ LP
On this camcorder				
Internal recording media	✓	✓	✓	✓
Memory card	✓	✓	✓	✓
On external devices				
External media (USB storage devices)	✓	✓	✓	✓
Blu-ray discs	—	—	✓	✓
AVCHD recording discs	—	—	—	✓

* [PS] can be set only when [2D] Frame Rate] is set to [50p].

Tips

- Movies are recorded with 1920 × 1080/50i or 1920 × 1080/50p format when 3D mode is selected, with 2D mode and the 1920 × 1080/50p format when the PS mode of high definition image quality (HD) is selected, and with AVCHD 1920 × 1080/50i or 1920 × 1080/25p format when the FX or FH mode is selected. When the HQ or LP mode of high definition image quality (HD) is selected, movies are recorded with AVCHD 1440 × 1080/50i format.
- You can select the following high definition image quality (HD) recording mode.
 - [3D] (HD 28M(3D))
 - [50p Quality **PS**] (AVC HD 28M (PS))
 - [Highest Quality **FX**] (AVC HD 24M (FX))

- [High Quality **FH**] (AVC HD 17M (FH))
- [Standard **HQ**] (AVC HD 9M (HQ)) (the default setting)
- [Long Time **LP**] (AVC HD 5M (LP))
- The recording mode of the standard image quality (STD) is limited to the following value.
 - [Standard **HQ**] (STD 9M (HQ))
- “M,” such as in “24M,” means “Mbps.”

Using the Tracking focus function

2D

If you touch the subject you want to track on the LCD screen, the camcorder tracks that subject and records a movie.

When you touch a face

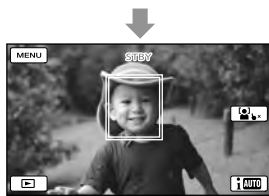
A double-lined frame appears around the face and the camcorder adjusts the focus, color and exposure automatically.

When you touch a point other than a face

A double-lined frame appears at the point you touch and the camcorder adjusts the focus automatically.



Touch the face or a point you want to track.



The double-lined frame is displayed.

To stop tracking, touch [b ×/2.0] that appears on the right of the LCD screen.

Notes

- The subject you touched may not be detected, depending on the surrounding brightness or hairstyle of the subject. In this case, touch the subject again when you record.
- If you want to track a face, set the [Face Detection] (p. 74) setting to other than [Off] ([Auto] is the default setting).

Tips






- The double-lined frame around a face targeted for possible smile detection shot turns orange.
- If the face you touched disappears from the LCD screen, the subject selected in [Face Detection] (p. 74) has priority. If the face you touched returns to the screen, that face has priority.

Recording high quality photos during movie recording (Dual Rec)




2D

You can record photos during movie recording by pressing PHOTO.

Notes

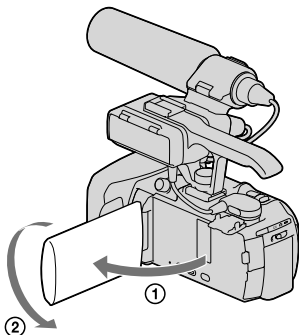
-  may appear when the capacity of the recording media is not enough or when you record photos continuously. You cannot record photos while  is displayed.
- Depending on the [ REC Mode] or [ Frame Rate] selected,  appears on the LCD screen and you may not be able to use the Dual Rec function.

Tips

- When the MODE lamp is set to  (Movie), the size of photos becomes [5.3M] (16:9) or [4.0M] (4:3).
- You can record photos during recording standby in the same way as when the  (Photo) lamp is turned on. However, when [ Frame Rate] is set to [25p], you cannot record photos while the camcorder is in movie recording mode.

Recording in mirror mode

3D 2D



Open the LCD panel 90 degrees to the camcorder (①), then rotate it 180 degrees to the lens side (②).

Tips

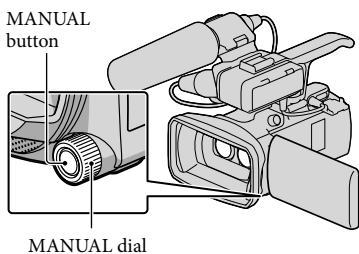
- A mirror-image of the subject appears on the LCD screen, but the image will be normal when recorded.

Controlling the image settings manually with the MANUAL dial

3D 2D

You can assign 1 menu item you use often to the MANUAL dial.

Since [3D Depth Adjustment] is assigned to the MANUAL dial in the default setting, the operation below is described as adjusting the 3D depth using the dial. [3D Depth Adjustment] is a function which adjusts the depth of the image appearing on the display of the camcorder while recording 3D movie.



- 1 Press **MANUAL** to make the camcorder adjust the depth of the 3D image.

Pressing **MANUAL** repeatedly toggles between enabling and disabling the 3D depth adjustment.

- 2 Rotate the **MANUAL** dial to adjust the 3D depth while checking the image on the LCD screen.

Items you can control with the **MANUAL** dial

3D recording

- [3D Depth Adjustment]
- [Focus] ... p. 70
- [Exposure] ... p. 70

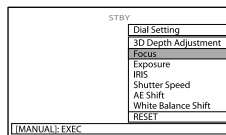
2D recording

- [Focus] ... p. 70
- [Exposure] ... p. 70
- [IRIS] ... p. 70
- [Shutter Speed] ... p. 70
- [AE Shift] ... p. 71
- [White Balance Shift] ... p. 71

To assign the menu item to the **MANUAL** dial

- ① Press and hold **MANUAL** down for a few seconds.

The [Dial Setting] screen appears.



- ② Rotate the **MANUAL** dial and select the item to be assigned.
- ③ Press **MANUAL**.

Notes

- Manual settings will be retained even if you change the assigned item of the **MANUAL** dial. However, if you set [Exposure] after setting [AE Shift] manually, [Exposure] will override [AE Shift].
- If you set either one of [Exposure], [IRIS], or [Shutter Speed], the settings of other 2 items are canceled.
- If you select [RESET] in step ②, all the items adjusted manually are reset to the default settings.

Tips

- If you touch **RESET** at the right of the screen while setting [3D Depth Adjustment], the manual setting of [3D Depth Adjustment] is canceled.
- In the case of items other than [3D Depth Adjustment], pressing **MANUAL** switches between automatic and manual settings.
- You can also assign menu items to the **MANUAL** dial by touching **MENU** (MENU) → [Camera/Mic] → **⏏** (Camera Settings) → [Dial Setting].
- Even if you open the **IRIS** wider (a smaller F-stop) than F3.4 when you set the zoom lever to the W (Wide angle) side, the **IRIS** is reset to F3.4 as you move the zoom lever to the T (Telephoto) side.

- If you adjust the IRIS, the in-focus range in front of and behind the focused subject is changed. When you open the IRIS wider (a smaller F-stop), the in-focus range becomes narrower, and when you close the IRIS narrower (a larger F-stop), the in-focus range becomes wider. You can set the IRIS to a preferred value depending on the shooting scenes.
- When you record images under a fluorescent lamp, sodium lamp, or mercury lamp, horizontal stripes may appear, flicker may occur, or color may change. In this case, change the shutter speed according to the power supply frequency in your region.
- The camera data (p. 82) that appears on the LCD screen will differ, depending on the recording settings of the camcorder. The settings will be displayed with the following icons.
 - **AUTO**: Automatic
 - **MANUAL**: Exposure is set manually.
 - **AE A**: IRIS priority
 - **AE S**: Shutter speed priority

Setting time data

3D 2D

The camcorder records movies accompanied by time data such as time code and user bit.

To change the time code and user bit

Select the item to be displayed by touching **MENU** (MENU) → [TC/UB] → [TC/UB Disp].

To preset the time code

- ① Touch **MENU** (MENU) → [TC/UB] → [TC Preset].
- ② Select the 2 digits you want to set, then set the value with ▲/▼.
You can set the time code between 00:00:00:00 and 23:59:59:24
- ③ Set other digits by repeating step ② and touch [OK].

To reset the time code

You can reset the time code (00:00:00:00) by touching **MENU** (MENU) → [TC/UB] → [TC Preset] → [Reset].

To reset the time code using the Wireless Remote Commander

You can reset the time code (00:00:00:00) also by pressing the TC RESET button on the Wireless Remote Commander.

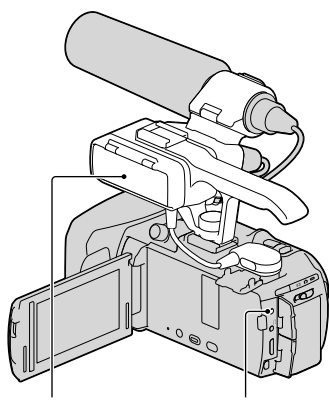
To preset the user bit

- ① Touch **MENU** (MENU) → [TC/UB] → [UB Preset].
- ② Select the 2 digits you want to set, then set the value with ▲/▼.
- ③ Set other digits by repeating step ② and touch [OK].

To reset the user bit

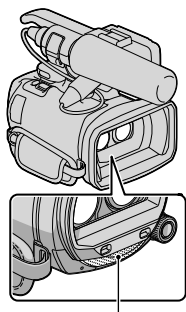
You can reset the user bit (00 00 00 00) by touching **MENU** (MENU) → [TC/UB] → [UB Preset] → [Reset].

Audio setup



XLR Adaptor

MIC input jack



Internal microphone

Select the method for inputting sound

You can select the method for inputting sound on the camcorder from 3 types; internal microphone, MIC input jack or XLR Adaptor.

Depending on the connection status of MIC input jack and XLR Adaptor, the order of priority to be selected is as follows.

MIC input jack > XLR Adaptor > internal microphone

Using the internal microphone

Detach the XLR Adaptor when you use the internal microphone. You can record stereo sound.

Tips

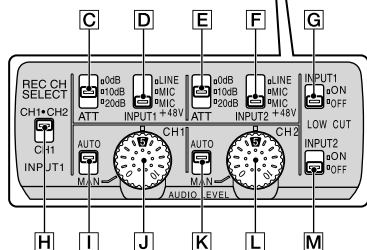
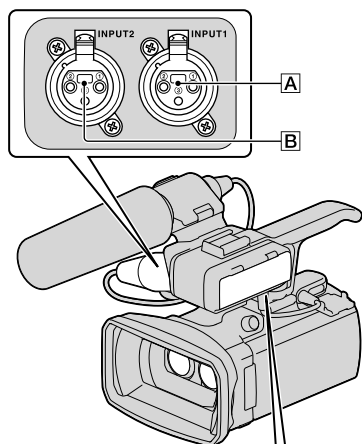
- To reduce wind noise, set [Wind Noise Reduct.] to [On] (p. 75).

Using an external microphone (sold separately)

When an external microphone is connected to the MIC input jack, sound is switched to that of the external microphone. Sound is not switched during recording.

Using the supplied microphone

Attach the XLR Adaptor when you use the supplied microphone (ECM-XM1). You can record monaural sound with the super-directional microphone.



Inputting external sound

- A** INPUT1 jack
- B** INPUT2 jack

Selecting a sound source

- D** INPUT1 (LINE/MIC/MIC+48V) switch
- F** INPUT2 (LINE/MIC/MIC+48V) switch

Selecting a sound source level

- C** ATT (INPUT1) switch
- E** ATT (INPUT2) switch

Selecting channel setting for recording

- H** REC CH SELECT (INPUT1) switch

Selecting the recording level

- I** AUTO/MAN (CH1) switch
- J** AUDIO LEVEL (CH1) dial
- K** AUTO/MAN (CH2) switch
- L** AUDIO LEVEL (CH2) dial

Switching wind noise reduction to ON/OFF

- G** LOW CUT (INPUT1) switch
- M** LOW CUT (INPUT2) switch

- 1** Attach the XLR Adaptor (p. 9), and connect the supplied microphone to INPUT1 jack **A**.
- 2** Set the INPUT1 (LINE/MIC/MIC+48V) switch **D** to MIC+48V.
- 3** Set the REC CH SELECT (INPUT1) switch **H** to CH1·CH2
This setting enables recording on both CH1, CH2. Set the switch to CH1 if you want to record on CH1 only.

Adjusting the recording level

You can adjust the recording level input from the INPUT1 **A**/INPUT2 **B** jacks. You cannot adjust the recording level of the internal microphone and MIC input jack.

- 1** Set the AUTO/MAN (CH1/CH2) switch of the channel to be adjusted (**I** or **K**) to MAN.

- 2 Turn the AUDIO LEVEL dial [J] or [L] to adjust the volume to the proper level.

Confirm that the volume is at the proper level with headphones or audio level meter (p. 77).

To restore automatic adjustment

Set the AUTO/MAN (CH1/CH2) switch [I] or [K] to AUTO.

Reducing wind noise

You can reduce wind noise input from the INPUT1/INPUT2 jacks [A] or [B].

Set the LOW CUT (INPUT1) switch [G] or LOW CUT (INPUT2) switch [M] to ON.

Tips

- You can select [HDE] Audio Format from [Linear PCM] or [Dolby Digital] when recording in high definition image quality (HD).
- You can adjust the volume of the headphones or speaker with [Volume] (p. 82).
- You can set [Audio Output Timing] of headphones and audio output jacks (p. 76).

Using an external audio device

Set as follows when you use a microphone other than the supplied microphone or an external audio device (mixer, etc.).

- 1 Select the sound source to be input.

Set the INPUT1/INPUT2 (LINE/MIC/MIC+48V) switch [D] or [F] according to the device to be connected to the INPUT1/INPUT2 jacks [A] or [B].

External audio device (mixer, etc.):
LINE

Dynamic microphone or microphone with built-in battery: MIC

Microphone that is 48 V phantom power compliant: MIC+48V

Notes

- If you connect a device that does not support 48 V phantom power, malfunction may result from setting this switch to MIC+48V. Check before connecting the device.
- If noise from the unused jack bothers you, set the INPUT1/INPUT2 (LINE/MIC/MIC+48V) switch of the unused jack ([D] or [F]) to LINE.

- 2 Set the input level of the microphone

When the INPUT1/INPUT2 (LINE/MIC/MIC+48V) switch [D] or [F] is set to MIC or MIC+48V, you can set the input level with ATT (INPUT1/INPUT2) switch [C] or [E]. Adjust according to the microphone sensitivity.

ATT 10dB is recommended when you use the supplied microphone (ECM-XM1).

The input levels are as follows.

ATT 0dB: -60dBu

ATT 10dB: -50dBu




ATT 20dB: -40dBu

⚡ Notes

- When the INPUT1/INPUT2 (LINE/MIC/MIC+48V) switch **[D]** or **[F]** is set to LINE, the input level is fixed to +4dBu. Even if you reset the ATT switch, the input level does not change.

3 Set the channel to be recorded.

You can select the channel to be recorded with REC CH SELECT (INPUT1) switch **[H]**.

The position of the REC CH SELECT (INPUT1) switch	Audio recorded on CH1, CH2
CH1·CH2	INPUT1  CH1 CH2
CH1	INPUT1  CH1
	INPUT2  CH2

💡 Tips

- To use a stereo microphone with 2 XLR (3PIN) plugs, connect Lch to the INPUT1 jack **[A]** and Rch to the INPUT2 jack **[B]**, and set the REC CH SELECT (INPUT1) switch **[H]** to CH1.

Making good use of your camcorder

The **3D** and **2D** icons indicate the 3D and 2D positions of the 2D/3D switch (p. 24), respectively.

Deleting images

3D 2D

You can free media space by deleting movies and photos from recording media.

⚡ Notes

- You cannot restore images once they are deleted. Save important movies and photos in advance.
- Do not remove the battery pack or the AC Adaptor from your camcorder while deleting the images. It may damage the recording media.
- Do not eject the memory card while deleting images from the memory card.
- You cannot delete protected movies and photos. Undo the protection of the movies and photos to delete them, before you try to delete them (p. 48).

💡 Tips

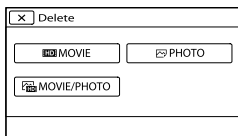
- If you start playing back an image by selecting it from the Event Index screen, you can delete the image using **[W]** on the playback screen.
- To delete all images recorded in the recording media, and recover all the recordable space of the media, format the media (p. 80).
- Reduced-size images which enable you to view many images at the same time on an index screen are called “thumbnails.”

1 Press **[VIEW]** (View Images) (p. 28).

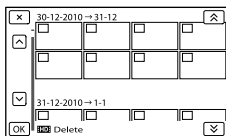
2 Touch **[MENU]** (MENU) → [Edit/Copy] → [Delete].

3 To select and delete movies, touch [Multiple Images].

- In the case of 2D, after touching [Multiple Images], select [**HDE**: MOVIE]/[**PHOTO**]/[**MOVIE/PHOTO**]. When [**HDE**: **STD** Setting] (p. 37) is set to [**STD**: STD Quality], **STD** appears instead of **HDE**.



4 Touch and display the ✓ mark on the movies or photos to be deleted.

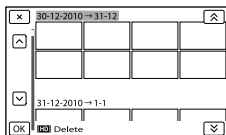


- Touch and hold the desired thumbnail so that you can confirm the image. Touch **X** to return to the previous screen.

5 Touch **OK** → **OK** → **OK**.

To delete all movies/photos in a event at one time

① In step 3, touch [All In Event].



- Touch **^** / **v** to select the desired event, then touch **OK**.
 - Touch and hold the desired thumbnail so that you can confirm the image. Touch **X** to return to the previous screen.
- Touch **OK** → **OK**.

Protecting recorded movies and photos (Protect)

3D **2D**

Protect movies and photos to avoid deleting them by mistake.

1 Press **VIEW** (View Images) (p. 28).

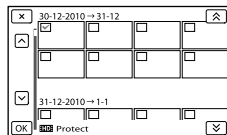
2 Touch **MENU** (MENU) → [Edit/ Copy] → [Protect].

3 To select and delete movies, touch [Multiple Images].

- In the case of 2D, after touching [Multiple Images], select [**HDE**: MOVIE]/[**PHOTO**]/[**MOVIE/PHOTO**]. When [**HDE**: **STD** Setting] (p. 37) is set to [**STD**: STD Quality], **STD** appears instead of **HDE**.

4 Touch the movies and photos to be protected.

✓ is displayed on the selected images.



- Touch and hold the desired thumbnail so that you can confirm the image. Touch **X** to return to the previous screen.

5 Touch **OK** → **OK** → **OK**.

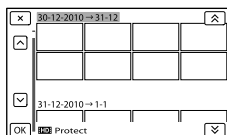
To undo the protection of movies and photos

Touch the movie or photo marked with ✓ in step 4.

✓ disappears.

To protect all movies/photos in an event at one time

① In step 3, touch [Set All In Event].



② Touch **^** / **v** to select the desired event, then touch **OK**.

- Touch and hold the desired thumbnail so that you can confirm the image. Touch **X** to return to the previous screen.

③ Touch **OK** → **OK**.

To undo the protection of an event

In step 2 above, touch [Remove All In Event], select the desired movies/photos, then touch **OK** → **OK** → **OK**.

Copying images

3D 2D

You can copy images back and forth between the internal recording medium of your camcorder and a memory card or other medium in an external device.

Insert a memory card into your camcorder before the operation.

Notes

- When you record an image on the memory card for the first time, create the image database file by touching **MENU** (MENU) → [Setup] → [Media Settings] → [Repair Img. DB F.] → [Memory Card].
- Connect your camcorder to the wall outlet (wall socket) using the supplied AC Adaptor to prevent your camcorder from running out of power during dubbing.

Tips

- The original copy of the image will not be deleted after the copy operation has been completed.
- The images recorded by this camcorder and stored onto the recording media are called "original."

1 Press **▶** (View Images) (p. 28).

2 Touch **MENU** (MENU) → [Edit/Copy] → [Copy].

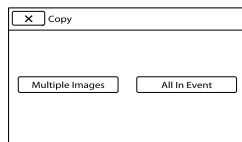
The media selection screen appears.

3 Touch the desired item to select the source and the destination for the images to be copied.

[Int. Memory → Memory Card]

[Memory Card → Int. Memory]

The [Copy] screen appears.



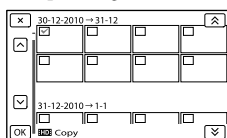
4 Touch the type of copy operation.

[Multiple Images]: To select multiple images and copy them

[All In Event]: To copy all images of a specified event

5 Select the image to be copied.

[Multiple Images]: Touch the image to be copied, and mark it with ✓. You can select multiple images.



- Touch the desired thumbnail so that you can confirm the image. Touch **✕** to return to the selection screen.

[All In Event]: Select the Event to be copied, then touch **OK**. You cannot select multiple Events.

6 Touch **OK** → **OK** → **OK**.

Tips

- To check the movies or photos after the copy operation is finished, use [Media Select] to select the destination medium, and then play the copied movies/photos (p. 20).
- You can copy images to various types of external media (p. 51).

Dividing a movie

3D 2D

You can divide a movie to delete unnecessary parts.

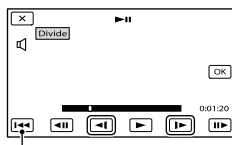
1 Touch **⏏** → [Divide] on the movie playback screen.

2 Touch **▶** to play back movies.

3 Touch **⏸** at the point where you want to divide the movie into scenes.

The movie pauses.

4 Touch **⏮**/**⏭** to adjust the dividing point with more precision.



Returns to the beginning of the selected movie

5 Touch **OK** → **OK**.

Notes

- You cannot restore movies once they are divided.
- You cannot divide protected movie. Undo the protection of the movie to divide it, before you try to divide it (p. 48).
- Do not remove the battery pack or the AC Adaptor from your camcorder while dividing the movie. It may damage the recording media.

- Do not eject the memory card while dividing movies on the memory card.
- A slight difference may occur from the point where you touch **II** and the actual dividing point, as your camcorder selects the dividing point based on about 0.5 second increments.
- Only simple editing is available on the camcorder. Use commercially available software for more advanced editing.

Capturing a photo from a movie

2D

You can capture images from movies recorded in the internal recording medium.

- 1 Touch **Photo Capture** → [Photo Capture] that appears on the playback screen of a movie.

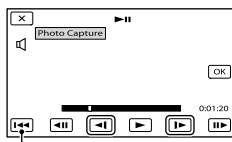
The [Photo Capture] screen appears.

- 2 Touch **Play** to play back movies.

- 3 Touch **II** at the point where you want to capture a photo.

The movie pauses.

- 4 Touch **Left Arrow** / **Right Arrow** to adjust the capturing point with more precision.



Returns to the beginning of the selected movie

5 Touch **OK**.

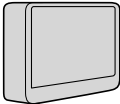

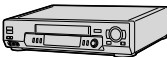
When capturing is finished, the screen returns to pause.

Notes

- The image size is fixed based on the image quality of the movie. If the movie was recorded with one of the following image quality levels, the image size will be set as shown below.
 - High definition image quality (HD): 2.1 M (16:9)
 - Wide aspect ratio (16:9) with standard definition image quality (STD): 0.2 M (16:9)
 - 4:3 aspect ratio with standard definition image quality: 0.3 M (4:3)
- The recording medium where you want to save photos should have enough free space.
- The recording date and time of captured photos is the same as the recording date and time of the movies.
- If the movie you are capturing from has no data code, the recording date and time of the photo will be the date and time you captured from the movie.

Selecting a method for saving images with an external device

You can save 3D movies and 2D high definition image quality (HD) movies using an external device. Select the method to be used according to the device.

Movies	External devices	Connecting cable	Page
3D/2D 	External media device Saving images on an external media device with high definition image quality (HD).	USB Adaptor Cable VMC-UAM1 (supplied)	53
2D 	DVD writer other than DVDirect Express Saving images on a DVD disc with high definition image quality (HD) or with standard definition image quality (STD).	USB cable (supplied)	56
	Hard disk recorder, etc. Saving images on a DVD disc with standard definition image quality (STD).	A/V connecting cable (supplied)	57

Movies that are recorded with standard definition image quality (STD)

Use the A/V connecting cable to connect the camcorder to an external device in which images are saved (p. 51).

Notes

- The AVCHD recording disc can be played back only on AVCHD format compatible devices.
- Discs with high definition image quality (HD) images recorded should not be used in DVD players/recorders. Because DVD players/recorders are not compatible with the AVCHD format, DVD players/recorders may fail to eject the disc.

The types of media on which images are saved

See page 39.

The devices on which the created disc can be played back

DVD disc with high definition image quality (HD)

AVCHD format playback devices, such as a Sony Blu-ray disc player or a PlayStation®3.

DVD disc with standard definition image quality (STD)

Ordinary DVD playback devices, such as a DVD player.

Notes

- Always maintain your PlayStation®3 to use the latest version of the PlayStation®3 system software.
- The PlayStation®3 may not be available in some countries/regions.

Saving images on an external media device

You can save movies and photos on an external media device (USB storage devices), such as an external hard disk drive. You can also play back images on the camcorder or another playback device.

Notes

- Refer to the instruction manual supplied with the external media device.

Tips

- You can save 3D movies on an external media device as they are.
- You can import images saved on the external media device to your computer by using the supplied software “Content Management Utility.”

Functions available after saving images on an external media device

- playback of images through the camcorder (p. 55)
- importing images to PC

Devices that cannot be used as an external media device

- You cannot use the following devices as an external media device.
 - media devices with a capacity exceeding 2 TB
 - ordinary disc drive such as CD or DVD drive
 - media devices connected via a USB hub
 - media devices with built-in USB hub
 - card reader

Notes


- You may not be able to use external media devices with a code function.
- The FAT file system is available for your camcorder. If the storage medium of the external device was formatted for the NTFS file system, etc., format the external media device using the camcorder before use. The format screen appears when an external media device is connected to your camcorder. Make sure that important data has not previously been saved on the external media device before you format it using the camcorder.


- Operation is not assured with every device satisfying requirements for operating.
- For details on available external media devices, go to the Sony support website in your country/region.

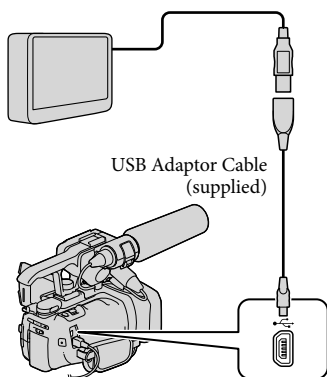
1 Connect the AC Adaptor and the power cord (mains lead) to the DC IN jack of your camcorder and the wall outlet (wall socket) (p. 15).

2 If the external media device has the AC power cable, connect it to the wall outlet (wall socket).

3 Connect the USB Adaptor Cable (supplied) to the external media device.

4 Connect the USB Adaptor Cable to the  (USB) jack of your camcorder.

Make sure not to disconnect the USB cable while [Preparing image database file. Please wait.] is displayed on the LCD screen. If [Repair Img. DB F.] is displayed on the camcorder screen, touch .



5 Connect the external media device to the camcorder and touch [Copy.] on the camcorder screen.

Movies and photos that are stored on one of the camcorder's recording media selected in [Media Select], and that have not yet been saved on external media device can be saved on the connected media device at this time.

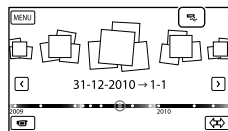
- This operation is available only when there are newly recorded images.

6 After operation is completed, touch **OK** on the camcorder screen.

When connecting an external media device

The images saved in the external media device are displayed on the LCD screen.


When an external media device is connected, the USB icon will appear on the Event View screen, etc.



You can make menu settings of the external media device such as deleting images.

Touch **MENU** (MENU) → [Edit/Copy] on Event View.

To disconnect the external media device

- ① Touch  while the camcorder is in the playback standby mode ([Event View] or Event Index is displayed) of the external media device.
- ② Disconnect the USB Adaptor Cable.

Notes

- The number of scenes you can save on the external media device are as follows. However, even if the external media device has free space, you cannot save scenes exceeding the following number.
 - High definition image quality (HD) movies: Max. 3,999
 - Standard definition image quality (STD) movies: Max. 9,999
 - Photos: Max. 40,000
- The number of scenes may be smaller depending on the camcorder setting and the type of images recorded.

Saving desired movies and photos

You can save desired images in the camcorder to the external media device.

- 1 Connect the camcorder to the external media device and touch [Play without copying].

Event View of the external medium is displayed.

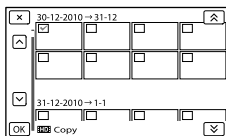
- 2 Touch **MENU** (MENU) → [Edit/Copy] → [Copy].

- 3 Follow the instructions that appear on the screen to select the recording media, image selection methods and type of the image.

- You cannot copy images from an external media device to the internal recording medium on the camcorder.

- 4 When you selected [Multiple Images], touch the image to be saved.

✓ appears.



- Press and hold the image down on the LCD screen to confirm the image. Touch **X** to return to the previous screen.
- If you select [All In Event], select the event to copy with **^** / **v**. You cannot select multiple events.

- 5 Touch **OK** → **OK** → **OK** on the camcorder screen.

Playing back images in the external media device on the camcorder

- 1 Connect the camcorder to the external media device and touch [Play without copying].

Event View of the external media device is displayed.

- 2 Select the image you want to view and play back the image (p. 28).

- You can also view images on a TV connected to your camcorder (p. 32).

To perform [Direct Copy] manually

You can perform [Direct Copy] manually while the camcorder is connected to an external media device.

- ① Touch **MENU** (MENU) → [Edit/Copy] → [Direct Copy] on the [Event View] screen of the external media device.
- ② Touch [Copy images that have not been copied.].
- ③ Touch **OK** → **OK**.

⚡ Notes

- If your camcorder does not recognize the external media device, try the following operations.
 - Reconnect the USB Adaptor Cable to your camcorder.
 - If the external media device has the AC power cord (mains lead), connect it to the wall outlet (wall socket).

Creating a high definition image quality (HD) disc with a DVD writer, etc., other than DVDirect Express

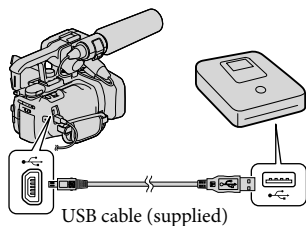
Use the USB cable to connect your camcorder to a disc creation device, which is compatible with high definition image quality (HD) movies, such as a Sony DVD writer. Refer also to the instruction manuals supplied with the device to be connected.

⚡ Notes

- You cannot save 3D movies.
- Sony DVD writer may not be available in some countries/regions.

1 Connect the AC Adaptor and the power cord (mains lead) to the DC IN jack of your camcorder and the wall outlet (wall socket) (p. 15).

2 Turn on your camcorder, and connect a DVD writer, etc. to your camcorder with the USB cable (supplied).



3 _____
Record movies on the connected device.

- For details, refer to the instruction manuals supplied with the device to be connected.

4 _____
After the operation is completed, touch **×** → **OK** on the camcorder screen.

5 _____
Disconnect the USB cable.

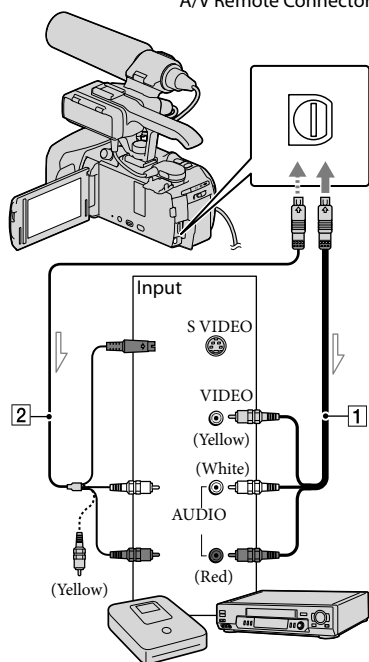
Creating a standard definition image quality (STD) disc with a recorder, etc.

You can copy images played back on your camcorder on a disc or video cassette, by connecting your camcorder to a disc recorder, a Sony DVD writer, etc., other than DVDirect Express, with the A/V connecting cable. Connect the device in either way of **1** or **2**. Refer also to the instruction manuals supplied with the devices to be connected.

ⓘ Notes

- 3D movies are converted to 2D with standard definition image quality (STD).
- Connect your camcorder to the wall outlet (wall socket) using the supplied AC Adaptor for this operation (p. 15).
- Sony DVD writer may not be available in some countries/regions.
- High definition image quality (HD) movies will be copied with standard definition image quality (STD).

A/V Remote Connector



➡ Signal flow

1 A/V connecting cable (supplied)

2 A/V connecting cable with S VIDEO (sold separately)

By using this cable, higher quality images can be produced than with an A/V connecting cable. Connect the white and red plug (left/right audio) and the S VIDEO plug (S VIDEO channel) of the A/V connecting cable with an S VIDEO cable. If you connect the S VIDEO plug only, you will hear no sound. The yellow plug (video) connection is not necessary.

1 Insert the recording media in the recording device.

- If your recording device has an input selector, set it to the input mode.

2 Connect your camcorder to the recording device (a disc recorder, etc.) with the A/V connecting cable 1 (supplied) or an A/V connecting cable with S VIDEO 2 (sold separately).

- Connect your camcorder to the input jacks of the recording device.

3 Start playback on your camcorder, and record it on the recording device.

- Refer to the instruction manuals supplied with your recording device for details.

4 When dubbing is finished, stop the recording device, and then your camcorder.

⚡ Notes

- Since copying is performed via analog data transfer, the image quality may deteriorate.
- You cannot copy images to recorders connected with an HDMI cable.
- To copy date/time information and camera data, touch **MENU** (MENU) → [Setup] → [▶] ([▶] Playback Settings)] → [Data Code] → a desired setting → **OK**.
- When the screen size of display devices (TV, etc.) is 4:3, touch **MENU** (MENU) → [Setup] → [↔] ([↔] Connection)] → [TV Type] → [4:3] → **OK**.
- When you connect a monaural device, connect the yellow plug of the A/V connecting cable to the video input jack, and the white (left channel) or the red (right channel) plug to the audio input jack on the device.

Saving images with a computer

Preparing a computer (Windows)

You can perform following operations using “Content Management Utility.”

- Importing images to a computer
- Viewing imported images
- Creating 2D left & right movies from 3D movie
- Detecting and correcting flash bands

To save movies using a computer, install the software from the supplied CD-ROM “Content Management Utility” beforehand. Use commercially available software to edit images or create discs.

Step 1 Checking the computer system

OS*1
Microsoft Windows XP SP3*2/Windows Vista SP2*3/Windows 7 SP1
CPU
Use an Intel Core 2 Duo 2.80 GHz CPU equivalent or faster to play back videos with high definition image quality (HD) in the highest quality. Videos with high definition image quality (HD) recorded in other than the highest quality may be played back with a slower CPU. Depending on the performance of your video card, videos with high definition image quality (HD) recorded using the highest quality may be played back with a slower CPU than that recommended above. For the following operations, an Intel Pentium III 1GHz or faster is necessary. – Importing movies to the computer – Processing with standard definition image quality (STD)
Memory
For Windows XP: 512 MB or more (1 GB or more is recommended.) For Windows Vista/Windows 7: 1 GB or more

Hard disk
Disk volume required for installation: Approximately 100 MB Only the NTFS or exFAT file system can be used for specifying to importing videos or registering them for viewing.
Display
Minimum 1,024 × 768 dots
Others
USB port (this must be provided as standard, High-Speed USB (USB 2.0 compatible)) (CD-ROM drive is necessary for installation)

- *1 Standard installation is required. Operation is not assured if the OS has been upgraded or in a multi-boot environment.
*2 64-bit editions and Starter (Edition) are not supported.
*3 Starter (Edition) is not supported.

ⓘ Notes

- Operation with all computer environments is not assured.
- The supplied software “Content Management Utility” is not supported by Macintosh computers.

Step 2 Installing the supplied software “Content Management Utility”

Install “Content Management Utility” before connecting your camcorder to a computer.

1 Confirm that your camcorder is not connected to the computer.

2 Turn on the computer.

- Log on as an Administrator for installation.
- Close all applications running on the computer before installing the software.

-
- 3** Place the supplied CD-ROM “Content Management Utility” in the disc drive of your computer.

The installation screen appears.

- If the screen does not appear, click [Start] → [Computer] (in Windows XP, [My Computer]), then double-click [SONYCMU(E:)] (CD-ROM).

-
- 4** Select the language for the application to be installed, then click [OK].

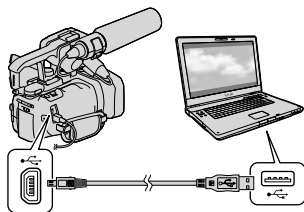
-
- 5** When the install wizard screen appears, click [Next].

-
- 6** Confirm the license agreement, and if you accept the terms, select [I accept the terms in the license agreement], then click [OK].

-
- 7** Select the drive or folder to install the application, then click [Next].

-
- 8** Select the option to create the desk-top shortcut, then click [Next].

-
- 9** Turn on your camcorder, then connect the camcorder to the computer using the supplied USB cable.



-
- 10** Touch [USB Connect] on the camcorder screen.

- If the [USB Connect] screen does not appear, touch **MENU** (MENU) → [Setup] → [↔ (↔ Connection)] → [USB Connect].

-
- 11** Click [Next].

-
- 12** Follow the on-screen instructions to install the software.


- Restart the computer if required to complete the installation.

When the installation is completed, the following icon will appear, depending on the selection in step 8.




-
- 13** Remove the CD-ROM from the computer.
-

To disconnect your camcorder from the computer

- ① Click the  icon at the bottom right of the desktop of the computer → [Safely remove USB Mass Storage Device-Drive].



- ② Touch  → [Yes] on the camcorder screen.
- ③ Disconnect the USB cable.

To play images recorded on the camcorder, using a computer

See Help of the supplied CD-ROM
“Content Management Utility.”

Notes

- When importing a long movie or edited image, use the supplied software “Content Management Utility.” If you use any other software, images may not be imported properly.
- If file size exceeds 2 GB during a long recording, a new file is created automatically, resulting in the movie being divided into multiple files when you view the recording media directly from your computer after recording.
- If you import images without using supplied “Content Management Utility,” files automatically created (due to the 2 GB limit) may not be concatenated. Even if you usually use other editing software, use the supplied software “Content Management Utility” to import images to the computer to ensure files are concatenated and imported to the computer.

Using menus

You can enjoy using your camcorder more by making good use of menu operations. The camcorder has various menu items under each of 6 menu categories.

 **Shooting Mode (Items for selecting a shooting mode) → p. 67**

 **Camera/Mic (Items for customized shooting) → p. 68**

 **Image Quality/Size (Items for setting up image quality or size) → p. 77**

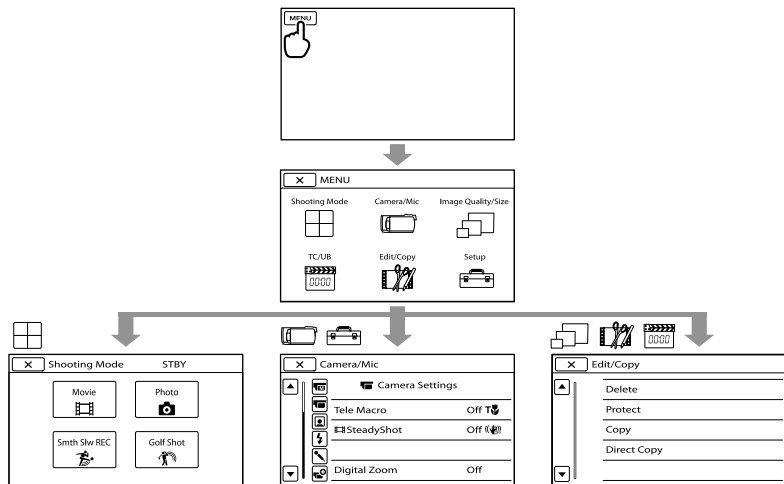
 **TC/UB (Items for setting up the time code or user bit) → p. 79**

 **Edit/Copy (Items for editing) → p. 80**

 **Setup (Other setup items) → p. 80**


Operating menus

Follow the procedures explained below to set the menu items.



The [Camera/Mic] and [Setup] menus have sub-categories. Touch the sub-category icon, and the screen changes to other sub-category menus. Grayed out menu items or settings are not available.

Notes

- You may not be able to set some menu items, depending on the recording or playback conditions.
- Touch  to finish setting the menu or to return to the previous menu screen.

Menu lists

The **3D** and **2D** icons indicate the 3D and 2D positions of the 2D/3D switch (p. 24), respectively.

Shooting Mode





Movie	Records movies.	67
Photo	Shoots photos.	67
Smth Slw REC	Records fast moving subjects in slow-motion.	67
Golf Shot	Divides two seconds of fast movement into frames which are then recorded as a movie and photos.	67

Camera/Mic

(Manual Settings)

White Balance	Adjusts the color balance to the brightness of the recording environment.	68
Spot Meter/Fcs	Adjusts the brightness and focus for the selected subject simultaneously.	69
Spot Meter	Adjusts the brightness of images to a subject you touch on the screen.	69
Spot Focus	Focuses on a subject you touch on the screen.	69
Exposure	Adjusts the brightness of movies and photos.	70
Focus	Focuses manually.	70
IRIS	Adjusts the iris.	70
Shutter Speed	Adjusts the shutter speed.	70
AE Shift	Adjusts the exposure manually.	71
White Balance Shift	Adjusts the white balance manually.	71
Low Lux	Records bright color images in the dim.	71

(Camera Settings)

Auto 3D Lens Adjust	Automatically corrects the vertical position of the right and left movies to record 3D movies that can be viewed comfortably, without blurring.	71
Scene Selection	Selects an appropriate recording setting according to the type of scene, such as night view or beach.	72
 Fader	Fades scenes in or out.	72
 Self-Timer	Sets the self-timer when your camcorder is in photo recording mode.	73
Tele Macro	Shoots a subject in focus with the background out of focus.	73
 SteadyShot	Sets the SteadyShot function when recording movies.	73
 SteadyShot	Sets the SteadyShot function when shooting photos.	74
Digital Zoom	Sets the maximum zoom level of the digital zoom that exceeds the zoom level of the optical zoom.	74
Auto Back Light	Adjusts the exposure for backlit subjects automatically.	74
Dial Setting	Assigns a function to the MANUAL dial.	74

(Face)

Face Detection	Adjusts the image quality of the face(s) automatically.	74
Smile Shutter	Automatically takes a shot whenever a smile is detected.	75
Smile Sensitivity	Sets the smile detection sensitivity using the smile shutter function.	75

(Microphone)

Blt-in Zoom Mic	Records movies with vivid sound appropriate to the zoom position.	75
Wind Noise Reduct.	Reduces the wind noise.	75
Microf Level	Sets the microphone level.	76
Audio Output Timing	You can set echo control when recording.	76

(Shooting Assist)










Guide Frame	Displays the frame to make sure the subject is horizontal or vertical.	76
Display Setting	Sets the duration that icons or indicators are displayed on the LCD screen.	76
Audio Level Display	Displays the audio level meter on the LCD screen.	77
 Audio Format	Switches the audio format.	77

Image Quality/Size

 REC Mode	Sets the mode to record movies. When recording fast moving subject, a high image quality is recommended.	38
 3D Frame Rate	Sets the frame rate when recording the 3D movie.	38
 2D Frame Rate	Sets the frame rate when recording the 2D movie.	38
 /  Setting	Sets image quality for recording, playback, or editing movies.	37
 Wide Mode	Sets the horizontal to vertical ratio when recording movies with standard definition image quality (STD).	77
 x.v.Color	Records wider range of colors.	78
 Image Size	Sets the photo size.	78

TC/UB

TC/UB Disp	Switch to display the time code and user bit.	42
TC Preset	Sets the time code.	42
UB Preset	Sets the user bit.	42
TC Run	Selects how the time code advances.	79
TC Make	Selects the recording type on the recording media.	79
UB Time Rec	Selects whether or not to save the actual time in the user bit code.	79

 Edit/Copy

Delete	Deletes movies or photos.	46
Protect	Protects movies or photos to avoid deleting.	47
Copy	Copies movies or photos.	48
Direct Copy	Copies images stored on the internal recording medium or on a memory card to some type of external media.	55

 Setup Media Settings)

Media Select	Sets the type of media to be used for recording movies or photos.	20
Media Info	Displays information on the recording media, such as free space.	80
Format	Deletes all data on the internal recording media or a memory card.	80
Repair Img. DB F.	Repairs the image database file on the internal recording media or a memory card.	92
File Number	Sets how to assign the file number.	81

 Playback Settings)

Data Code	Sets how to assign the file number.	81
Volume	Adjusts the volume of playback sound.	82

 Connection)

TV Type	Converts the signal depending on the TV connected.	82
Component	Select this option when you connect your camcorder to a TV with the component input jack.	83
HDMI 3D Setting	Select the output format of the right and left images when you connect your camcorder to a 3D TV with the HDMI cable (supplied).	83
HDMI Resolution	Selects the output image resolution when connecting your camcorder to a TV with the HDMI cable (supplied).	83
HDMI Output Link	Select whether to link the image on the LCD screen and TV screen.	83
HDMI TC Output	Transfers time code, user bit data to the device connected with the HDMI cable (supplied).	84
USB Connect	Selects which type of media on the camcorder is to be used when the camcorder is connected to an external device via USB.	84

(General Settings)

60i/50i Sel	Switch 1080/60i (NTSC-system) and 1080/50i (PAL-system).	84
Beep	Sets whether the camcorder sounds operation beeps or not.	84
LCD Brightness	Adjusts the brightness of the LCD screen.	84
REC Lamp	Sets the recording lamp to light up or not.	85
Remote Ctrl	Sets whether the Wireless Remote Commander is to be used or not.	85
A. Shut Off	Changes the [A. Shut Off] setting.	85
Power On By LCD	Sets whether or not the camcorder is turned on and off when you open and close the LCD screen.	85
Language Setting	Sets the display language.	85
Battery Info	Displays the battery information.	85

(Clock Settings)

Date & Time Setting	Sets the [Date & Time Format], [Summer Time], or [Date & Time].	85
Area Setting	Adjusts for a time difference without stopping the clock.	86

Shooting Mode (Items for selecting a shooting mode)

See “Using menus” (p. 62) on the operation.
The default settings are marked with ►.

Movie

3D 2D

You can record movies.

Photo

2D

You can shoot photos.


Smth Slw REC (Smooth slow rec)


2D

Fast moving subjects and actions, which cannot be captured under the ordinary shooting conditions, can be shot in smooth moving slow-motion for about 3 seconds. Press START/STOP on the [Smth Slw REC] screen.

An about-3-second movie is recorded as a 12-second-slow-motion movie. [Recording...] disappears, when recording is finished.

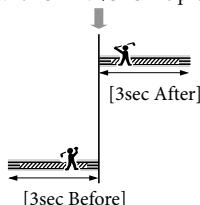
To change the timing at which the camcorder starts recording

Touch  to make the setting.


 (Timing)

Select the recording start point after START/STOP is pressed. The default setting is [3sec After].

The point when START/STOP is pressed.



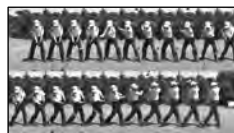
Notes

- You cannot record sound.
- Image quality is not as good as that of normal recording.
- The [ REC Mode] will be set to [Standard HQ] automatically
- When the standard definition image quality (STD) mode is selected, you cannot record movies using [Smth Slw REC].

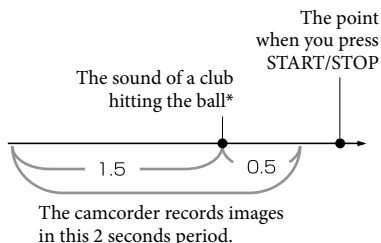
Golf Shot

2D

Divides 2 seconds of fast movement into frames which are then recorded as a movie and photos. You can view a series of movement when playing back, which is convenient in cases such as checking golf swing or tennis form.



On the [Golf Shot] screen, frame the subject in the white frame in the center of the screen, then press START/STOP right after the subject has taken a swing. When the sound of a club hitting the ball is detected, the recording time period is automatically adjusted according to that moment.



* The camcorder sets the point when the loudest sound in the past 1 second is detected, as the sound of a club hitting the ball.

⚙ Notes

- If the camcorder cannot detect the sound of a club hitting the ball, the camcorder automatically sets the impact point at 0.5 second before the START/STOP button has been pressed, and records a movie in the time period between 1.5 seconds before the impact point to 0.5 second after the impact point.
- The size of photos becomes $1,920 \times 1,080$.
- You cannot record sound.
- Image quality is not as good as that of normal recording.
- The [REC Mode] will be set to [Standard HQ] automatically.
- You cannot record movies with [Golf Shot] when you set the image quality to standard definition image quality (STD).

💡 Tips

- To use the self-timer, touch [/]. With [/] set to [On], press START/STOP to start countdown of the timer. The point when countdown reaches 0 is assumed as the moment of impact and motion before and after 0 is recorded.
- If camera shake is excessive, or there are moving objects in the background during recording, image analysis will not be performed effectively, and images may contain noise as a result. It is recommended that you record images under stable conditions (for example, using a tripod).
- Impact sound may be detected by the internal microphone even when an external microphone or XLR Adaptor is attached.



Camera/Mic

(Items for customized shooting)

See “Using menus” (p. 62) on the operation. The default settings are marked with ►.

White Balance



You can adjust the color balance to the recording environment.



► Auto

The white balance is adjusted automatically.

Outdoor (☀)

The white balance is appropriately adjusted for the following recording conditions:

- Outdoors
- Night views, neon signs and fireworks
- Sunrise or sunset
- Under daylight fluorescent lamps

Indoor (💡)

The white balance is appropriately adjusted for the following recording conditions:


- Indoors
- At party scenes or studios where the lighting conditions change quickly
- Under video lamps in a studio, or under sodium lamps or incandescent-like color lamps

One Push (📷)

The white balance will be adjusted according to the ambient light.

- ① Touch [].
- ② Frame a white object such as a piece of paper, to fill the screen under the same lighting conditions as you will shoot the subject.
- ③ Touch [SET].

⚡ Notes

- Set [White Balance] to [Auto] or adjust the color in [One Push] under white or cool white fluorescent lamps.
- When you select [One Push], keep framing white objects.
- While the camcorder is recording a movie,  SET is grayed out and [One Push] cannot be set.
- If you set [White Balance], [Scene Selection] is set to [Auto].

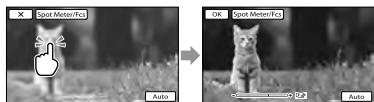
💡 Tips

- If you have changed the battery pack while [Auto] was selected, or taken your camcorder outdoors after inside use (or vice versa), aim your camcorder at a nearby white object for about 10 seconds for better color balance adjustment.
- When the white balance has been set with [One Push], if the lighting conditions changed by bringing your camcorder outdoors from inside the house, or vice versa, you need to redo the [One Push] procedure to readjust the white balance.

Spot Meter/Fcs (Spot meter/focus)



You can adjust the brightness and focus for the selected subject simultaneously. This function enables you to use [Spot Meter] (p. 69) and [Spot Focus] (p. 69) at the same time.



Touch the subject of which you want to adjust the brightness and focus.
To adjust the brightness and focus automatically, touch [Auto].

⚡ Notes

- [Exposure] and [Focus] are automatically set to [Manual].

Spot Meter (Flexible spot meter)



You can adjust and fix the exposure to the subject, so that it is recorded in suitable brightness even when there is strong contrast between the subject and the background, such as subjects in the spotlight on stage.



Touch the subject of which you want to adjust the exposure.
To return the setting to automatic exposure, touch [Auto].

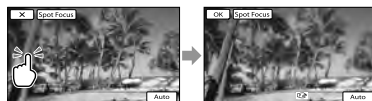
⚡ Notes

- [Exposure] is automatically set to [Manual].

Spot Focus



You can select and adjust the focal point to aim it at a subject not located at the center of the screen.



Touch the subject of which you want to adjust the focus.
To adjust the focus automatically, touch [Auto].

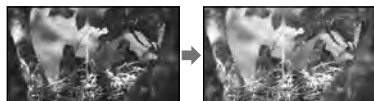
⚡ Notes

- [Focus] is automatically set to [Manual].

Exposure



You can fix the brightness of a picture manually. Adjust the brightness when the subject is too bright or too dark.



Touch **-** / **+** to adjust the brightness. To adjust the exposure automatically, touch [Auto].

Tips

- You can also adjust manually by using the MANUAL dial (p. 40).

Focus



You can adjust the focus manually. You can select this function also when you want to focus on a certain subject intentionally.



Touch **nearby subject** / **distant subject** to adjust the focus.

To adjust the focus automatically, touch [Auto].

Notes

- When you set [Focus] to [Manual], appears.
- The minimum possible distance between camcorder and subject while maintaining sharp focus is about 1 cm (about 13/32 in.) for wide angle and about 80 cm (about 2 ft. 7 1/2 in.) for telephoto.

Tips

- appears when the focus cannot be adjusted any closer, and appears when the focus cannot be adjusted farther away.

- It is easier to focus on the subject by moving the power zoom lever towards T (telephoto) to adjust the focus, then towards W (wide angle) to adjust the zoom for recording. When you want to record a subject at close range, move the power zoom lever to W (wide angle), then adjust the focus.
- The focal distance information (distance at which the subject is focused on; used as a guide if it is dark and focus adjustment is difficult) appears for a few seconds in the following cases.
 - When the focus mode is switched from automatic to manual
 - When you set focus manually
- You can also adjust manually by using the MANUAL dial (p. 40).

IRIS



You can shoot images with the IRIS priority mode. If you adjust the IRIS, you can sharpen the subject with its background blurred or sharpen the whole image.

► Auto

Adjusts IRIS automatically.

Manual

Adjusts IRIS manually.

Tips

- You can also adjust manually by using the MANUAL dial (p. 40).

Shutter Speed



You can shoot images with the Shutter Speed priority mode. When you shoot a moving subject at a higher shutter speed, it appears as if frozen on the image. At a lower shutter speed, the subject appears as if it is flowing.

► Auto

Adjusts the shutter speed automatically.

Manual

Adjusts the shutter speed manually.

💡 Tips

- You can also adjust manually by using the MANUAL dial (p. 40).

AE Shift



You can adjust the exposure manually.

► Off

Adjusts the exposure automatically.

On (EV and adjusted number)

Adjusts the exposure manually.

💡 Tips

- You can adjust the automatic exposure level to brighter or darker when [Exposure] is set to [Auto].
- Touch **+** if the subject is white or the backlight is bright, or touch **-** if the subject is black or the light is dim.
- You can also adjust manually by using the MANUAL dial (p. 40).

White Balance Shift



You can adjust the white balance manually.

► Off

Adjusts the white balance automatically.

On (WB and adjusted number)

Adjusts the white balance manually.

💡 Tips

- When the white balance is set to a lower value, images appear bluish, and when it is set to higher value, images appear reddish.
- You can also adjust manually by using the MANUAL dial (p. 40).

Low Lux



You can record bright color images, even in dim light.

► Off

The Low Lux function is not used.

On (🔦)

The Low Lux function is used.

Auto 3D Lens Adjust



Automatically corrects the vertical position of the right and left movies to record 3D movies that can be viewed comfortably, without blurring.

Aim the camcorder at a subject that produces a scale higher than the ◀ mark on the LCD screen, and then touch **OK** (p. 18).

💡 Notes

- Use [Auto 3D Lens Adjust] in the following cases.
 - When you feel that the 3D movies do not look the way you want them to
 - When you have not adjusted the 3D lenses for a while
 - When a strong mechanical shock has been applied to the camcorder
 - When using the camcorder in a very hot or cold place
- When [3D Frame Rate] is set to [24p], you cannot use [Auto 3D Lens Adjust]. Set [3D Frame Rate] to [60i], when you use [Auto 3D Lens Adjust].

💡 Tip

- If [Could not adjust.] appears while zooming out, touch [Run Again].

Scene Selection



You can record images effectively in various situations.

► Auto

Records images in average image quality without the [Scene Selection] function.

Twilight* (☾)

Maintains the darkening atmosphere of the distant surroundings in twilight scenes.



Sunrise&Sunset* (☀)

Reproduces the atmosphere of scenes such as sunsets or sunrises.



Fireworks* (💣)

Takes spectacular shots of fireworks.



Landscape* (🏞)

Shoots distant subjects clearly. This setting also prevents your camcorder from focusing on glass or metal mesh in windows between the camcorder and the subject.



Portrait (👤)

Brings out the subject such as people or flowers while creating a soft background.



Spotlight** (🎤)

Prevents people's faces from appearing excessively white when subjects are lit by strong light.



Beach** (🏖)

Takes the vivid blue of the ocean or a lake.



Snow** (❄)

Takes bright pictures of a white landscape.



- * Adjusted to focus on subjects farther away only.
- ** Adjusted not to focus on subjects a short distance away.

⚡ Notes

- Even if you set [Twilight Portrait], the setting changes to [Auto] in movie recording mode.
- If you set [Scene Selection], [White Balance] setting is canceled.

Fader



You can record a transition with the following effects adding to the interval between scenes.

Select the desired effect in [STBY] (to fading in) or [REC] (to fading out) mode.

► Off

Does not use an effect.

White Fader (👉)

Fades in/out with the white effect.



Black Fader (👈)

Fades in/out with the black effect.



To cancel the fader before starting the operation, touch [Off].

⚡ Notes

- If you operate the 2D/3D switch, the setting is returns to default.

Tips

- When you press START/STOP the setting is cleared.
- The thumbnails of movie recorded using [Black Fader] may be difficult to see on Event View or other screens.



Self-Timer



2D

Press PHOTO to start the count down. A photo is recorded after about 10 seconds.

► Off

Cancels the self-timer.

On (☺)

Starts the self-timer recording. To cancel the recording, touch [Reset].

Notes

- If you operate the 2D/3D switch, the setting is returns to default.

Tips

- You can also operate by pressing PHOTO on the Wireless Remote Commander (p. 118).

Tele Macro



2D

This is useful to shoot small subjects, such as flowers or insects. You can blur out backgrounds and the subject stands out clearer.

► Off

Cancels Tele Macro. (Tele Macro is also canceled when you move the zoom lever to the W side.)

On (TV)

The zoom (p. 36) moves to the top of the T (telephoto) side automatically and allows recording subjects at close range down to about 25 cm (9 7/8 in.).



Notes

- If you operate the 2D/3D switch, the setting is returns to default.
- When recording a distant subject, focusing may be difficult and can take some time.
- Adjust the focus manually ([Focus], p. 70) when it is hard to focus automatically.



SteadyShot



3D 2D

You can compensate for camera shake. Set [SteadyShot] to [Off] (☹) when using a tripod (sold separately), then the image becomes natural.

► Active

Provides a more powerful SteadyShot effect.

Standard

Provides a SteadyShot effect, performing wide-angle recording under relatively stable recording conditions.

Off (☹)


The SteadyShot function is not used.

Notes

- If you change the setting of [SteadyShot], the imaging field will also change accordingly.

- You can magnify images up to 12 times the original size using optical zooming, unless [SteadyShot] is set to [Active]. (2D only)

SteadyShot

You can compensate for camera shake. Set [SteadyShot] to [Off] () when using a tripod (sold separately), then the image becomes natural.

► On

The SteadyShot function is used.

Off ()

The SteadyShot function is not used.

Digital Zoom

You can select the maximum zoom level. Note that the image quality decreases when you use the digital zoom.



The zooming zone appears when you set [160×].

► Off

Up to 17× zoom is performed.

160×

Up to 160× zoom is performed digitally.

Note

- You can magnify images up to 12 times the original size using optical zooming, unless [SteadyShot] is set to [Active].

Auto Back Light

Your camcorder adjusts the exposure for backlit subjects automatically.

► On

Adjusts the exposure for backlit subjects automatically.

Off

Does not adjust the exposure for backlit subjects.

Dial Setting

You can select an item you want to set to the MANUAL dial. For details, see page 40.

Face Detection

You can set the camcorder to detect a face automatically. Furthermore, you can select which faces (children or adults) the camcorder detects with priority. It adjusts the focus/color/exposure automatically for the face of the selected subject. Also, it adjusts the image quality of face parts more finely, in the case of the high definition image quality (HD) movies.

► Auto

Detects faces without distinction between adults and children.

Child Priority()

Gives faces of children priority.

Adult Priority()

Gives faces of adults priority.

Off ()

Does not detect faces.

Notes

- The frame appears around the face only when recording 2D movie.

- Faces may not be detected depending on recording conditions, subject conditions, and the setting of your camcorder.
- [Face Detection] may not function properly depending on recording conditions. Set [Face Detection] to [Off] in this case.

Tips

- For better face detection performance, shoot the subject(s) under the following conditions.
 - Shoot in a sufficiently bright place
 - The subject(s) does not wear glasses, a hat or mask
 - The subject(s) faces directly towards the camera
- If you select a subject which has priority by touching the frame that has appeared around the subject's face, a double-lined frame will appear and that face has priority (2D only, p. 39).

Smile Shutter 2D

The shutter is released when the camcorder detects a smile.

► Dual Capture

Only during movie recording, the shutter is released automatically, when the camcorder detects a smile.

Always On

The shutter is released when the camcorder detects a smile whenever the camcorder is in recording mode.

Off OFF

Smiles are not detected, so photos are not recorded automatically.

Notes

- Smiles may not be detected depending on recording conditions, subject conditions, and the setting of your camcorder.
- [Smile Shutter] does not work during movie recording in the following cases.
 - [2D Frame Rate] is set to 25p or 50p
 - [REC Mode] is set to [High Quality FX]

Tips

- You can detect a face or a smile on a subject with [Face Detection] (p. 74). If you select a face by touching the frame displayed on the LCD screen, the frame becomes double-lined and that face has priority.
- If the camcorder does not detect smiles properly, adjust [Smile Sensitivity] (p. 75).

Smile Sensitivity 2D

Sets the smile detection sensitivity for using the Smile Shutter function.

Slight Smile

Detects even a slight smile.

► Normal Smile

Detects a normal smile.

Big Smile

Detects a big smile.

Blt-in Zoom Mic 3D 2D

You can record a movie with vivid sound appropriate to the zoom position.

► Off

The microphone does not record sound following zooming in or out.

On

The microphone records sound following zooming in or out.

Wind Noise Reduct. 3D 2D

You can record a movie with less wind noise by cutting the low-frequency sound input from the built-in microphone.

► Off

Disables wind noise reduction.

On (🔊)

Enables wind noise reduction.

⚙️ Notes

- If you turn the [Wind Noise Reduct.] function to [On], the [Blt-in Zoom Mic] function turns off automatically.

Micref Level (Microphone reference level)



You can select the microphone level for recording sound.

► Normal

Records various ambient sounds, converting them into the appropriate level.

Low (🔊)

Records ambient sound faithfully. Select [Low] when you want to record an exciting and powerful sound in a concert hall, etc. (This setting is not suitable for recording conversations.)

Audio Output Timing



You can set the audio output timing during recording.

► Live

Remove echo caused from the difference between the actual sound heard during recording and that heard through headphones.

Lip Sync

Resolves sync issues between picture and sound.

Guide Frame



You can display the frame and check that the subject is horizontal or vertical.

The frame is not recorded.

► Off

Does not display the guide frame.

On

Displays the guide frame.



⚙️ Tips

- Positioning the subject at the cross point of the guide frame makes a balanced composition.
- The outer frame of [Guide Frame] shows the display area of a TV which is not compatible with full pixel display.

Display Setting



You can set the duration of displaying the icons or indicators on the LCD screen.

► Auto

Displays for about 3 seconds. The rec & zoom buttons on the LCD screen is displayed.

On

Always displays. The rec & zoom buttons on the LCD screen is not displayed.

⚙️ Tips

- The icons or indicators are displayed in the following cases.
 - When you turn on your camcorder.
 - The LCD screen is touched (Except rec & zoom buttons on LCD screen).
 - When you switch your camcorder to the movie recording, photo recording, or playback mode.

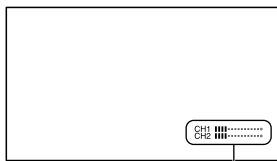
Audio Level Display



You can select whether or not to display the audio level meter.

► On

Displays the audio level meter.



Audio level meter

Off

Does not display the audio level meter.

[HD] Audio Format



You can set the audio format for high definition image quality (HD) recording.

► Linear PCM (LPCM)

Records in Linear PCM system.

Dolby Digital

Records in Dolby Digital system.

⚡ Notes

- Audio format is fixed to [Dolby Digital] with the standard definition image quality (STD) recording.

Image Quality/Size (Items for setting up image quality or size)

See “Using menus” (p. 62) on the operation.
The default settings are marked with ►.

[REC Mode]



See page 38.

[3D] Frame Rate (3D Frame Rate)



See page 38.

[2D] Frame Rate (2D Frame Rate)



See page 38.

[HD] / [STD] Setting



See page 37.

[Wide Mode]



When recording standard definition image quality (STD) movies, you can select the horizontal to vertical ratio according to the TV connected. Refer also to the instruction manuals supplied with your TV.

► 16:9 WIDE

Records movies to the full screen on a 16:9 (wide) TV screen.

4:3 (4:3)

Records movies to the full screen on a 4:3 TV screen.

⚡ Notes

- Set [TV Type] correctly according to the TV connected for playback (p. 82).

x.v.Color 3D 2D

You can capture wider range of colors.
Various colors such as the brilliant color of flowers and turquoise blue of the sea can be more faithfully reproduced. Refer to the instruction manuals of the TV.

► Off

Records in ordinary color range.

On ((COLOR))

Records in x.v.Color.

Notes



- Set [ x.v.Color] to [On] when the recorded movie will be played back on an x.v.Color-compliant TV.
- If the movie recorded with this function [On] is played back on a non-x.v.Color-compliant TV, the color may not be reproduced correctly.
- [ x.v.Color] cannot be set to [On]:
 - When the image quality is set to the standard definition image quality (STD)
 - While recording a movie

Image Size 2D

You can select a size for the photos you are going to shot.

► 4:3 7.1M ()

Records photos clearly (3,072 × 2,304).

16:9 5.3M ()

Records photos clearly in the 16:9 (wide) ratio (3,072 × 1,728).


4:3 1.9M ()

Allows you to record more photos in relatively clear quality (1,600 × 1,200).

4:3 VGA(0.3M) ()

Allows the maximum number of photos to be recorded (640 × 480).

Notes

- The selected image size is effective when the  (Photo) lamp is lit.



TC/UB

(Items for setting up the time code or user bit)

TC/UB Disp

See page 42.

TC Preset

See page 42.

UB Preset

See page 42.

TC Run

You can select how the time code advances.

► Rec Run

Advances the time code only during recording. Select this setting to record the time code continuous from the last time code of the previous recording.

Free Run

Advances the time code regardless of operation of your camcorder.

Notes

- Even if the time code advances in the [Rec Run] mode, the time code may not be recorded sequentially in the following cases.
 - When the recording format is changed.
 - When the recording media is removed.

TC Make

► Preset

Records the newly set time code on the recording media.

Regenerate

Reads the last time code of the previous recording from the recording media and records the new time code consecutively from the last time code during the backspace editing.

The time code runs in [Rec Run] mode regardless of the setting of [TC Run].

UB Time Rec

► Off

Does not save the actual time in the user bit code.

On

Saves the actual time in the user bit code.

Notes

- The last 2 digits are fixed to 00 when it is set to [On].

Edit/Copy (Items for editing)

See “Using menus” (p. 62) on the operation.

Delete 

See page 46.

Protect 

See page 47.

Copy 

See page 48.

Direct Copy 

See page 55.

Setup (Other setup items)

See “Using menus” (p. 62) on the operation.
The default settings are marked with ▶.

Media Select  

See page 20.

Media Info  

You can check the remaining recordable time for each recording mode of the recording media for movies and the approximate free and used media space of the recording media.

To turn off the display

Touch .



Notes

- Since there is a management file area, the used space is not displayed as 0 % even if you perform [Format] (p. 80).

Tips

- The camcorder can display the information of the medium selected on [Media Select] (p. 20). Change the medium setting if necessary.

Format  

Formatting deletes all the movies and photos to recover recordable free space. Select the recording media to be formatted, touch  → .

Notes

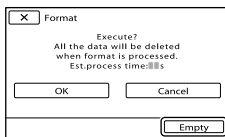
- Connect your camcorder to the wall outlet (wall socket) using the supplied AC Adaptor for this operation (p. 15).
- To avoid the loss of important images, you should save them before formatting the recording media.
- Protected movies and photos will also be deleted.

- While [Executing...] is displayed, do not close the LCD screen, operate the buttons on the camcorder, disconnect the AC Adaptor, or eject the memory card from your camcorder. (The access lamp is lit or flashing while formatting memory card.)

To prevent data on the internal recording media from being recovered

[Empty] allows you to write unintelligible data onto the internal recording media of the camcorder. In this way it may become more difficult to recover any original data. When you dispose of or transfer the camcorder, it is recommended that you perform [Empty].

When the internal recording media is selected on the [Format] screen, touch [Empty].



⚡ Notes

- Connect the AC Adaptor to the wall outlet (wall socket). You cannot perform [Empty] unless you connect the AC Adaptor to the wall outlet (wall socket).
- To avoid the loss of important images, they should be saved on a computer or other devices before performing [Empty].
- Disconnect all cables except the AC Adaptor. Do not disconnect the AC Adaptor during the operation.
- While deleting data, do not apply any vibrations or shocks to your camcorder.
- You can check the time that the camcorder will take to delete data on the LCD screen.
- If you stop performing [Empty] while [Executing...] appears, be sure to complete the operation by performing [Format] or [Empty] when you use the camcorder next time.

Repair Img. DB F.



See page 92, 94, 96.

File Number



You can select the way to assign file number of photos.

► Series

Assigns file numbers of photos in sequence. The file number becomes larger each time you record a photo. Even if the memory card is replaced with another one, the file number is assigned in sequence.

Reset

Assigns file numbers in sequence, following the largest file number existing on the recording medium. When the memory card is replaced with another one, the file number is assigned for each memory card.

Data Code



During playback, your camcorder displays the information (Date/Time, Camera Data) recorded automatically at the time of recording.

► Off

Data code is not displayed.

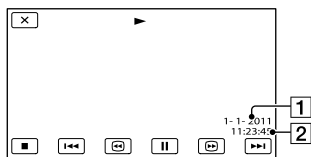
Date/Time

Displays the date and time.

Camera Data

Displays camera setting data.

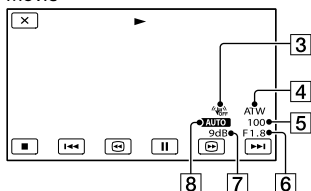
Date/Time



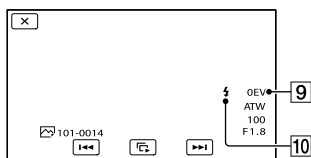
- 1 Date
- 2 Time

Camera Data

Movie



Photo



- 3 SteadyShot off
- 4 White Balance
- 5 Shutter Speed
- 6 IRIS (Aperture value)
- 7 Gain
- 8 Brightness
- 9 Exposure
- 10 Flash

Tips

- The data code is displayed on the TV screen if you connect your camcorder to a TV.
- The indicator toggles through the following sequences as you press DATA CODE on the Wireless Remote Commander: [Date/Time] → [Camera Data] → [Off] (no indication).
- Depending on the recording media condition, bars [---:---] appear.

Volume



You can adjust the volume of playback sound by touching **⏮ / ⏭**.

TV Type



You need to convert the signal depending on the TV connected when playing back recorded movies and photos. The recorded movies and photos are played back as following illustrations.

▶ 16:9

Select this to view your movies on a 16:9 (wide) TV. The recorded movies and photos are played back as shown below.

Movies and photos recorded in 16:9 (wide) mode



4:3

Select this to view your movies and photos on a 4:3 standard TV. The recorded movies and photos are played back as shown below.

Movies and photos recorded in 16:9 (wide) mode



⚡ Notes

- Horizontal to vertical ratio of high definition image quality (HD) movies is 16:9.

Component



Select [Component] when connecting your camcorder to a TV with the component input jack.

576i

► 1080i/576i

1080p/576i

HDMI 3D Setting



Select the output format of the right and left images when connecting your camcorder to a 3D TV with the HDMI cable (supplied).

► Auto

Normal setting (outputs the images according to the TV, automatically).

Frame Packing

Outputs the right and left images in full high definition image quality as they were recorded.

Side-by-Side

Halves the resolution of the right and left images in full high definition image quality, and outputs the right and left images aligned side by side.

HDMI Resolution



Select the output image resolution when connecting your camcorder to a TV with the HDMI cable (supplied).

► Auto

Normal setting (outputs the signal according to the TV automatically).

1080p/576p

Outputs high definition image quality (HD) movies with a 1080p signal and standard image quality (STD) movies with a 576p signal.

1080i/576i

Outputs high definition image quality (HD) movies with a 1080i signal and standard image quality (STD) movies with a 576i signal.

720p/576p

Outputs high definition image quality (HD) movies with a 720p signal and standard image quality (STD) movies with a 576p signal.

576p

Outputs the 576p signal.

576i

Outputs the 576i signal.

⚡ Notes

- When [2D] Frame Rate is set to [50p] and [HDMI Resolution] is set to [720p/576p] or [576p], HDMI signals cannot be output during recording.

HDMI Output Link



Select whether to link the image on the LCD screen and TV screen when connecting your camcorder to a 3D compatible TV with a HDMI cable (supplied).

► Fixed to 3D

The image on the TV screen is fixed to 3D if you press 2D/3D DISP (p. 25) and set the image on the LCD screen to 2D.

Panel unity

The image on the TV screen and LCD screen toggles through together the following sequences as you press 2D/3D DISP (p. 25);
3D → Left and Right images mixed → Left image only → Right image only.



Tips

- When you connect your camcorder to a TV that is not compatible with 3D and select [Panel unity], the image on the TV screen toggles through the following sequences as you press 2D/3D DISP (p. 25);
Left image only → Left and Right images mixed → Left image only → Right image only.

HDMI TC Output



You can transfer time code, user bit data to the device connected with the HDMI cable.

► Off

Does not output time code, user bit code.

On

Outputs time code, user bit code.



Notes

- When set to [On], the displayed image is not to be 3D if the connected device is not compatible to HDMI TC input.

USB Connect



Select this item when [USB Select] does not appear on the LCD screen by connecting the camcorder to a computer with the USB cable (supplied).

See page 60.

60i/50i Sel



Select the settings depending on the TV color systems of the countries/regions where you use the camcorder.

60i

Select this when the TV color system is NTSC.

► 50i

Select this when the TV color system is PAL.



Notes

- You cannot record/play back in the setting of 50i (60i) for the recording media which is formatted or recorded in the setting of 60i (50i). Use another recording media or perform [Format] if the message "Movie recording disabled." is displayed after switched the setting of [60i/50i Sel]

Bleep



On

A melody sounds when you start/stop recording, or operate the touch panel.

► Off

Cancels the melody.

LCD Brightness



You can adjust the brightness of the LCD screen.

► Normal

Normal setting (normal brightness).

Bright

Select this when the LCD screen is not bright enough.



Tips

- This adjustment does not affect the recorded images in any way.

REC Lamp (Recording lamp)



You can make the camera recording lamp on the front of your camcorder not to turn on.

► On

The camera recording lamp lights up.

Off

The camera recording lamp does not light up.

Remote Ctrl (Remote control)



► On

Select this when you use the supplied Wireless Remote Commander (p. 118).

Off

Select this when you do not use supplied Wireless Remote Commander.



- Select [Off] when you want to prevent your camcorder from responding to a command sent by another remote control unit.

A. Shut Off (Auto shut off)



You can set your camcorder to turn off automatically when you do not operate your camcorder for more than about 5 minutes.

On

The camcorder turns off automatically.

► Off

The camcorder does not turn off automatically.

Power On By LCD



You can set the power of the camcorder to turn on or off by opening or closing the LCD screen panel.

Off

Does not turn the power on or off by opening or closing the LCD screen panel.

► On

Turns the power on or off by opening or closing the LCD screen panel.

Language Setting



You can select the language to be used on the LCD screen.

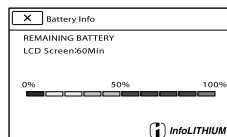


- Your camcorder offers [ENG[SIMP]] (simplified English) for when you cannot find your native tongue among the options.

Battery Info



You can check the estimated remaining capacity of the battery.



To close the battery information screen Touch **X**.

Date & Time Setting



■ Date & Time Format

You can select one from 4 types of date and time format.

■ Summer Time

You can change this setting without stopping the clock. Set to [On] to move the time forward 1 hour.

On

Sets the summertime.

► Off

Does not set the summertime.

■ Date & Time

See page 16.

Area Setting



You can adjust a time difference without stopping the clock. Select your local area when using the camcorder in other time zones. Refer to the world time difference information on page 102.

► Home

Select this item when you are going to use the camcorder in the area where you are living.

Destination (📍)

Select this item when you want to use the camcorder with the area setting set to another place.

👤 Tips

- If you visit a certain place often and want to use the camcorder with the area setting set to that place, it is useful if you set the place to [Destination].

? Troubleshooting

If you run into any problems using your camcorder, follow the steps below.

- ① Check the list (p. 87 to 97), and inspect your camcorder.



- ② Disconnect the power source, attach the power source again after about 1 minute, and turn the camcorder on.



- ③ Press RESET (p. 115) using a pointed object, and turn the camcorder on. If you press RESET, all settings, including the clock setting, are reset.



- ④ Contact your Sony dealer or local authorized Sony service facility.

- Your camcorder may be required to initialize or change the current internal memory of your camcorder, depending on the problem. In the event of this, the data stored on the internal memory will be deleted. Be sure to save the data on the internal memory on other media (backup) before sending your camcorder for repair. We will not compensate you for any loss of internal memory data.
- During repair, we may check a minimum amount of data stored on the internal memory in order to investigate the problem. However, your Sony dealer will neither copy nor retain your data.
- Overall operations/Wireless Remote Commander..... p. 87
- Batteries/power sources p. 88
- LCD screen p. 89
- Memory card p. 89
- Recording..... p. 90
- Playback p. 91
- Playing back images stored on memory card on other devices..... p. 92
- Editing movies/photos on your camcorder. p. 92

- Playback on the TV p. 92
- Copying/Connecting to other devices p. 93
- Connecting to a computer p. 93

Overall operations/Wireless Remote Commander

The power does not turn on.



- Attach a charged battery pack to the camcorder (p. 13).
- The plug of the AC Adaptor has been disconnected from the wall outlet (wall socket). Connect it to the wall outlet (wall socket) (p. 13).

The camcorder does not operate even when the power is set to on.

- It takes a few seconds for your camcorder to be ready to shoot after the power is turned on. This is not a malfunction.
- Disconnect the AC Adaptor from the wall outlet (wall socket) or remove the battery pack, then reconnect it after about 1 minute. If the functions still do not work, press RESET (p. 115) using a thin object. (If you press RESET, all settings, including the clock setting, are reset.)
- The temperature of your camcorder is extremely high. Turn off your camcorder and leave it for a while in a cool place.
- The temperature of your camcorder is extremely low. Leave your camcorder with the power of your camcorder on. If you still cannot operate your camcorder, turn off your camcorder and take it to a warm place. Leave the camcorder there for a while, then turn on your camcorder.

The menu settings have been changed automatically.

- While Intelligent Auto is active, some menu settings related to image quality will be changed automatically.

- The following menu items return to the default settings when you switch among movie recording and photo recording and playback modes.
 - [ Fader]
 - [ Self-Timer]
 - [Tele Macro]
- The following menu items return to the default settings when you operate the 2D/3D switch.
 - [White Balance]
 - [IRIS]
 - [Shutter Speed]
 - [AE Shift]
 - [White Balance Shift]
 - [Low Lux]
 - [Scene Selection]
 - [Auto Back Light]

Your camcorder gets warm.



- Your camcorder may become warm during operation. This is not a malfunction.

A rattling noise can be heard when you shake the camcorder.

- If no noise is heard when the camcorder is turned on and is in the movie/photo recording mode, the noise is produced by the movement of the internal lens. This is not a malfunction.

Intelligent Auto is canceled.

- The Intelligent Auto setting is canceled if you change the following settings:
 - [Smth Slw REC]
 - [Golf Shot]
 - [White Balance]
 - [Spot Meter/Fcs]
 - [Spot Meter]
 - [Spot Focus]
 - [Exposure]
 - [Focus]
 - [IRIS]
 - [Shutter Speed]
 - [AE Shift]
 - [White Balance Shift]
 - [Low Lux]
 - [Scene Selection]

- [Tele Macro]
- [ SteadyShot]
- [ SteadyShot]
- [Auto Back Light]
- [Face Detection]

The supplied Wireless Remote Commander does not function.

- Set [Remote Ctrl] to [On] (p. 85).
- Insert a battery into the battery holder with the +/- polarities correctly matching the +/- marks (p. 118).
- Remove any obstructions between the Wireless Remote Commander and the remote sensor.
- Point the remote sensor away from strong light sources such as direct sunlight or overhead lighting. Otherwise, the Wireless Remote Commander may not function properly.
- Remove the supplied lens hood.

Another DVD device malfunctions when you use the supplied Wireless Remote Commander.

- Select a commander mode other than DVD 2 for your DVD device, or cover the sensor of your DVD device with black paper.

Batteries/power sources

The power abruptly turns off.

- Use the AC Adaptor.
- If [A. Shut Off] is set to [On], when about 5 minutes have elapsed while you do not operate your camcorder, the camcorder is automatically turned off (A. Shut Off). Change the setting of [A. Shut Off] (p. 85), or turn on the power again.
- Charge the battery pack (p. 13).

The CHG (charge) lamp does not light while the battery pack is being charged.

- Close the LCD screen (p. 13).

- Attach the battery pack to the camcorder correctly (p. 13).
- Connect the power cord (mains lead) to the wall outlet (wall socket) properly.
- The battery charge is completed (p. 13).

The CHG (charge) lamp flashes while the battery pack is being charged.

- If the temperature of the battery pack is too high or too low, you may not be able to charge it (p. 105).
- Attach the battery pack to the camcorder correctly (p. 13). If the problem persists, disconnect the AC Adaptor from the wall outlet (wall socket) and contact your Sony dealer. The battery pack may be damaged.

The remaining battery time indicator does not indicate the correct time.

- The ambient temperature is too high or too low. This is not a malfunction.
- The battery pack has not been charged enough. Fully charge the battery again. If the problem persists, replace the battery pack with a new one (p. 106).
- The indicated time may not be correct depending on the environment of use.

The battery pack is quickly discharged.

- The ambient temperature is too high or low. This is not a malfunction.
- The battery pack has not been charged enough. Fully charge the battery again. If the problem persists, replace the battery pack with a new one (p. 106).

LCD screen

Menu items are grayed out.

- You cannot select grayed items in the current recording/playback situation.
- There are some functions you cannot activate simultaneously.

The buttons do not appear on the touch panel.

- Touch the LCD screen lightly.
- Press DISPLAY on the Wireless Remote Commander (p. 118).

The buttons on the touch panel do not work correctly or do not work at all.

- If you cover the panel with a commercially available protective film, the panel may not operate.
- If you are touching somewhere other than the point you should touch, the panel may not operate properly. Touch only the point where the feature you want to operate is located.

The buttons on the touch panel quickly disappear.

- Set [Display Setting] to [On] (p. 76).

There are dots in the shape of a grid on the screen.

- These points are a normal result of the manufacturing process of the screen and do not affect the recording in any way.

The screen is dark.

- The screen becomes darker when displaying 3D movies.

Memory card

Operations using the memory card cannot be performed.

- If you use the memory card formatted on a computer, format it again on your camcorder (p. 80).

Images stored on the memory card cannot be deleted.

- The maximum number of images that you can delete on the index screen at one time is 100.

- You cannot delete the protected images.



The data file name is not indicated correctly or flashes.

- The file is damaged.
- The file format is not supported by your camcorder (p. 105).




Recording

Refer also to “Memory card” (p. 89).

Pressing START/STOP or PHOTO does not record images.

- The playback screen is displayed. Press MODE to turn on the  (Movie) or  (Photo) lamp (p. 24).
- Your camcorder is recording the image you have just shot on the recording media. You cannot make new recording during this period.
- The recording media is full. Delete unnecessary images (p. 46).
- Total number of movie scenes or photos exceeds the recordable capacity of your camcorder. Delete unnecessary images (p. 46).
- The temperature of your camcorder is extremely high. Turn off your camcorder and leave it for a while in a cool place.
- The temperature of your camcorder is extremely low. Turn off your camcorder and take it to a warm place. Leave the camcorder there for a while, then turn on the camcorder.

Photos cannot be recorded.

- You cannot record photos together with:
 - 3D
 - [Smth Slw REC]
 - [Golf Shot]
 - [ Fader]
- The camcorder cannot shoot photos while it is in the movie recording mode, depending on the [ REC Mode], [ Frame Rate] selected.

The access lamp remains lit or flashing even if recording was stopped.

- Your camcorder is recording the scene you have just shot on the memory card.

The imaging field looks different.

- The imaging field may look different depending on the condition of your camcorder. This is not a malfunction.

The actual recording time for movies is less than the expected recording time of the recording media.

- Depending on the recording conditions, the time available for recording may be shorter, for example when recording a fast moving object, etc.

The camcorder stops operating.

- The temperature of your camcorder is extremely high. Turn off your camcorder and leave it for a while in a cool place.
- The temperature of your camcorder is extremely low. Turn off your camcorder and take it to a warm place. Leave the camcorder there for a while, then turn on the camcorder.
- If you keep applying vibration on the camcorder, recording may stop.

3D movies are not recorded as correct 3D movies.

- Adjust the image position with [Auto 3D Lens Adjust] (p. 71).

There is a time difference between the point when START/STOP is pressed and the point that the recording movie is started or stopped actually.

- On your camcorder, there may be a slight time difference between the point where you press START/STOP and the actual point that recording movie starts/stops. This is not a malfunction.

The horizontal to vertical ratio of the movie (16:9 (wide)/4:3) cannot be changed.

- The horizontal to vertical ratio of high definition image quality (HD) movies is 16:9 (wide).

The auto focus does not function.

- Set [Focus] to [Auto] (p. 70).
- The recording conditions are not suitable for auto focus. Adjust the focus manually (p. 70).

SteadyShot does not function.

- Set [SteadyShot] to [Active] or [Standard] (p. 73), [SteadyShot] to [On] (p. 73).
- Even if [SteadyShot] is set to [Active] or [Standard], [SteadyShot] to [On], your camcorder may not be able to compensate for excessive vibrations.

Tiny spots in white, red, blue, or green appear on the screen.

- This phenomenon appears when using a slow shutter speed (p. 70). This is not a malfunction.

The subjects passing by the screen very fast appear crooked.

- This is called the focal plane phenomenon. This is not a malfunction. Because of the way the image device (CMOS sensor) reads out image signals, the subjects passing by the lens rapidly might appear crooked depending on the recording conditions.

Horizontal stripes appear on the images.

- This occurs when recording images under a fluorescent lamp, sodium lamp, or mercury lamp. This is not a malfunction.

Black bands appear when you record a TV screen or computer screen.

- Set [SteadyShot] to an option except for [Active] (p. 73).
- Adjust the shutter speed (p. 40).

[LCD Brightness] cannot be adjusted.

- You cannot adjust [LCD Brightness] when:
 - The LCD panel is closed on your camcorder with the LCD screen facing out.
 - The power is supplied from the AC Adaptor.

Sound is not recorded correctly.

- If you disconnect an external microphone, etc. during recording movies, sound may not be recorded correctly.
- Connect the microphone again in the same way as when you start recording movies.
- If you leave the camcorder on a table, etc. when recording, noise may be recorded. Hold the camcorder with your hand when recording.

The time code is not recorded in sequence.

- The time code may not be recorded sequentially if you change the settings of [H/SD/STD Setting], [Frame Rate], or [Frame Rate] (p. 37).

Playback


Images cannot be played back.

- Select the type of recording media you want to play back (p. 20).
- Select the image quality of the movie you want to play back (p. 37).
- Images recorded on other devices may not be played back. This is not a malfunction.



Photos cannot be played back.

- Photos cannot be played back if you have modified files or folders, or have edited the data on a computer. (The file name flashes in that case.) This is not a malfunction.

is indicated on a thumbnail.

- This may appear on an image recorded on other devices, edited on a computer, etc.
- You removed the AC Adaptor or the battery pack while the recording media icon at the top right corner of the screen flashes, or before the access lamp is turned off after recording. This may damage your image data and  is displayed.

is indicated on a thumbnail.

- The image data base file may be damaged. Check the data base file by touching **MENU** (MENU) → [Setup] →  (Media Settings) → [Repair Img. DB F.] → the recording medium. If it still appears, delete the image with  (p. 46).

No sound or only a quiet sound is heard during playback.

- Turn up the volume (p. 30).
- When you record sound with [Micref Level] (p. 76) set to [Low], the recorded sound may be difficult to hear.
- Sounds cannot be recorded while shooting with [Smth Slw REC] or [Golf Shot].

Multi ch appears on the LCD screen.

- This appears when you play back movies recorded with 5.1ch surround sound. 5.1ch surround sound is down-mixed to 2ch stereo and played back on your camcorder.

Playing back images stored on memory card on other devices

Images cannot be played back or the memory card is not recognized.

- The playback device does not support playing back memory cards (p. 4).

Editing movies/photos on your camcorder

Unable to edit.

- Unable to edit because of the condition of the image.

A movie cannot be divided.

- A movie that is too short cannot be divided.
- A protected movie cannot be divided.

A photo cannot be captured from a movie.

- The recording media where you want to save photos is full.
- Set the 2D/3D switch to 2D (p. 24).

Playback on the TV

Neither image nor sound is played on the connected TV.

- When you are using a component A/V cable (supplied), set [Component] according to the requirements of the connected device (p. 83).
- When you are using the component video plug, make sure the red and white plugs of the component A/V cable (supplied) are connected (p. 32).
- Images are not output from the HDMI OUT jack, if copyright protection signals are recorded in the images.

- When you are using the S VIDEO plug, make sure the red and white plugs of the A/V connecting cable are connected (p. 34).

The top, bottom, right, and left edges of images are trimmed slightly on a connected TV.

- The LCD screen of your camcorder can display recording images across the entire screen (full pixel display). However, this may cause slight trimming of the top, bottom, right, and left edges of images when played back on a TV which is not compatible with full pixel display.
- It is recommended you record images using the outer frame of [Guide Frame] (p. 76) as a guide.

The image appears distorted on the 4:3 TV.

- This happens when viewing an image recorded in the 16:9 (wide) mode on a 4:3 TV. Set [TV Type] correctly (p. 82) and play back the image.

Black bands appear at the top and bottom of the screen of the 4:3 TV.

- This happens when viewing an image recorded in the 16:9 (wide) mode on a 4:3 TV. This is not a malfunction.

Copying/Connecting to other devices

Images are not copied correctly.

- You cannot copy images using the HDMI cable.
- The A/V connecting cable is not connected properly. Make sure to connect the cable to the input jack of another device (p. 57).

Connecting to a computer

The computer does not recognize the camcorder.

- Disconnect the cable from the computer, and then connect it again securely.
- Disconnect the cable from the computer, restart the computer, and then connect the computer to your camcorder correctly.

Movies cannot be viewed or copied to a computer.

- Disconnect the cable from the computer, and then connect it again.
- You need to install the supplied "Content Management Utility" to copy movies from your camcorder to your computer (p. 59).

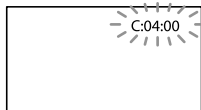
The computer freezes.

- Disconnect the cable from your computer and camcorder. Reboot your computer, and connect your computer and camcorder following the steps in the correct order.

Self-diagnosis display/ Warning indicators

When an error occurs, a warning indicator appears on the LCD screen.

You can fix some problems associated with the symptoms yourself. If the problem persists even after you have tried a couple of times, contact your Sony dealer or local authorized Sony service facility.



C:(or E:) □□:□□ (Self-diagnosis display)

C:04:□□

- The battery pack is not an “InfoLITHIUM” battery pack (V series). Use an “InfoLITHIUM” battery pack (V series) (p. 105).
- Connect the DC plug of the AC Adaptor to the DC IN jack of your camcorder securely (p. 13).

C:06:□□

- The battery pack temperature is high. Change the battery pack or place it in a cool place.

C:13:□□ / C:32:□□

- Remove the power source. Reconnect it and operate your camcorder again.

E:□□:□□

- Follow the steps from ② on page 87.

⚡ (Battery level warning)

- The battery pack is nearly used up.
- Depending on the operating environment or battery conditions, ⚡ may flash, even if there are about 20 minutes remaining.

⚠ (Warning indicator pertaining to battery pack temperature)

- The battery pack temperature is high. Change the battery pack or place it in a cool place.

HDMI ⚠ (Warning indicator pertaining to HDMI output stopped by overheating)

- Because the temperature of your camcorder has reached a level where HDMI output has stopped, no image is displayed on the connected monitor, etc. Leave the camcorder until the temperature decreases. However, you can continue recording on the camcorder.

💾 (Warning indicator pertaining to memory card)

Slow flashing

- Free spaces for recording images are running out. For the type of memory card you can use with your camcorder, see page 21.
- No memory card is inserted (p. 21).

Fast flashing

- There are not enough free spaces for recording images. After storing the images on other media (p. 51), delete unnecessary images, or format the memory card (p. 80).
- The image database file may be damaged. Check the database file by touching **MENU** (MENU) → [Setup] → [Media Settings] → [Repair Img. DB F.] → the recording medium.
- The memory card is damaged.

🗑️ (Warning indicator pertaining to memory card formatting)

- The memory card is damaged.
- The memory card is not formatted correctly (p. 80).


🚫 (Warning indicator pertaining to incompatible memory card)

- Incompatible memory card is inserted (p. 21).

🔒 (Warning indicator pertaining to the write-protect of the memory card)

- The memory card is write-protected.
- Access to the memory card was restricted on another device.

(Warning indicator pertaining to the external media device)

- The image database file may be damaged. Check the database file by touching **MENU** (MENU) → [Setup] → [ (Media Settings)] → [Repair Img. DB F.] the recording medium.
- The external media device is damaged.



(Warning indicator pertaining to format of the external media device)

- The external media device is damaged.
- The external media device is not formatted correctly.

(Warning indicator pertaining to camera-shake warning)

- The camcorder is unsteady, so camera-shake easily occurs. Hold the camcorder steady with both hands and record the image. However, note that the camera-shake warning indicator does not disappear.

(Warning indicator pertaining to photo recording)

- The recording media is full.
- Photos cannot be recorded during processing. Wait for a while, then record.
- When [ REC Mode] is set to [Highest Quality **FX**] or [50p Quality **PS**], you cannot capture photos while recording movies. Furthermore, if [ Frame Rate] is set to [24p] or [25p], you cannot record photos while the camcorder is in movie recording standby mode.

Tips

- You may hear a melody when some warning indicators appear on the screen.

Description of warning messages

If messages appear on the screen, follow the instructions.

Recording media

Cannot recognize the internal memory. Format and use again.

- The internal recording medium of the camcorder is set differently from the default format. Performing [Format] (p. 80) may enable you to use your camcorder. This will delete all data in the internal recording medium.

Data error.

- An error occurred during reading or writing the internal recording media of the camcorder.
- This may occur when you keep applying shock on the camcorder.
- Movies recorded on other devices may not be played back.

Inconsistencies found in image database file. Do you want to repair the image database file?

Inconsistencies found in image database file. Cannot record or play HD movies. Do you want to repair the image database file?

- You cannot record or play back movies because no movie management information exists. If you touch **OK**, new management information is created and you can record or play back movies.

Inconsistencies found in the image database file. Back up and recover. Recover, then import using the included PC software.

- Inconsistencies occur in the image database file because high definition image quality (HD) movie management information

is damaged. If you touch **OK**, new management information is created by backing up a high definition image quality (HD) movie. The backed up movies cannot be recognized. If you connect to a computer that has been installed with the supplied software "Content Management Utility," you can copy the backed up high definition image quality (HD) movies.

Buffer overflow. Writing to the media was not completed in time.

- You have performed recording and erasing operations repeatedly, or a memory card that has been formatted by other device is used. Copy and take data backup to other device (such as a computer), and then format the memory card on the camcorder (p. 80).
- The size of the inserted memory card is not sufficient for copying the movie(s). Use the recommended memory card (p. 21).

Recovering data.

- Your camcorder tries to recover data automatically if the data writing was not performed properly.

Cannot recover data.

- Writing data onto the media of the camcorder has failed. Attempts were made to recover the data, but they were unsuccessful.

Reinsert the memory card.

- Reinsert the memory card a few times. If even then the indicator flashes, the memory card could be damaged. Try with another memory card.

Cannot recognize this memory card. Format and use again.

- Format the memory card (p. 80). Note that if you format the memory card, all the recorded movies and photos are deleted.

Still picture folder is full. Cannot record still pictures.

- You cannot create folders exceeding 999MSDCF. You cannot create or delete created folders using your camcorder.
- Format the memory card (p. 80), or delete folders using your computer.

This memory card may not be able to record or play movies.

- Use a memory card recommended for your camcorder (p. 21).


This memory card may not be able to record or play images correctly.

- Use a memory card recommended for your camcorder (p. 21).
- Contact your Sony dealer. The battery pack may be damaged.

Do not eject the memory card during writing. Data may be damaged.

- Reinsert the memory card, and follow the instructions on the LCD screen.

External media cannot execute functions.

- Check the data base file by touching **MENU** (MENU) → [Setup] →  (Media Settings) → [Repair Img. DB F.] the recording medium.
- If even then the indicator flashes, reconnect the external media device, and then perform the format. Note that if you format the external media device, all the recorded movies and photos in it are deleted.
- If you cannot perform the format, the external media may not be supported by the camcorder, or it may be damaged. Try with another external media.

Unable to access external media.

- Use the external media device in stable condition (the environment such as no vibration and room temperature, etc.).
- Make sure to the power source of the external media device is connected.

Other

Maximum number of images already selected.

- You can select only 100 images at one time for:
 - Deleting movies/photos
 - Protecting movies/photos, or releasing the protection
 - Copying movies/photos

Data protected.

- You tried to delete protected data. Release the protection of the data.

Recording time of movies/number of recordable photos

“HD” stands for high definition image quality, and “STD” stands for standard image quality.

Expected time of recording and playback with each battery pack

Recording time



Approximate time available when you use a fully charged battery pack.

3D

Battery pack	(unit: minute)	
	Continuous recording time	Typical recording time
NP-FV50	65	30
NP-FV70 (supplied)	140	70
NP-FV100	280	140

2D

Battery pack	(unit: minute)			
	Continuous recording time		Typical recording time	
Image quality	HD	STD	HD	STD
NP-FV50	90	100	45	50
NP-FV70 (supplied)	190	215	95	105
NP-FV100	385	430	190	215

- Each recording time is measured in the following conditions.
 - When recording high definition image quality (HD) with [ REC Mode] set to [].
 - When the XLR Adaptor and supplied microphone are attached.
- Typical recording time shows the time when you repeat recording start/stop, switching the MODE lamp, and zooming.
- Times measured when using the camcorder at 25 °C (77 °F). 10 °C to 30 °C (50 °F to 86 °F) is recommended.

- The recording and playback time will be shorter when you use your camcorder in low temperatures.
- The recording and playback time will be shorter depending on the conditions under which you use your camcorder.

Playing time

Approximate time available when you use a fully charged battery pack.

3D

(unit: minute)

Battery pack	
NP-FV50	130
NP-FV70 (supplied)	270
NP-FV100	535

2D

(unit: minute)

Battery pack		
Image quality	HD	STD
NP-FV50	150	170
NP-FV70 (supplied)	315	355
NP-FV100	625	710

Expected recording time of movies

Internal recording media

High definition image quality (HD) in h (hour) and min (minute)

Recording mode	Recording time
[3D]	7 h 30 min (7 h 30 min) 7 h 55 min (7 h 55 min)
[50p Quality PS]	7 h 30 min (7 h 30 min) 8 h (8 h)
[Highest Quality FX]	8 h 50 min (8 h 50 min) 9 h 25 min (9 h 25 min)
[High Quality FH]	11 h 45 min (11 h 45 min) 12 h 55 min (12 h 55 min)
[Standard HQ]	19 h 30 min (15 h 20 min) 22 h 50 min (17 h 15 min)
[Long Time LP]	30 h 50 min (26 h 35 min) 40 h 5 min (32 h 45 min)

- Top: When [**3D**] Audio Format] is set to [Linear PCM]
- Bottom: When [**3D**] Audio Format] is set to [Dolby Digital]

Standard definition image quality (STD) in h (hour) and min (minute)

Recording mode	Recording time
[Standard HQ]	23h 55 min (21 h 55 min)

Notes

- The number in () is the minimum recordable time.

Tips

- You can record movies of a maximum of 3,999 scenes with high definition image quality (HD), and 9,999 scenes with standard definition image quality (STD).
- The maximum continuous recording time of movies are as follows.
3D: Approximately 6 h 30 min
2D: Approximately 13 h

Depending on the settings of the camcorder, the recording time will be shorter.

- Your camcorder uses the VBR (Variable Bit Rate) format to automatically adjust image quality to suit the recording scene. This technology causes fluctuations in the recording time of the media. Movies containing quickly moving and complex images are recorded at a higher bit rate, and this reduces the overall recording time.

Memory card

High definition image quality (HD)

(unit: minute)

	2 GB	4 GB	8 GB	16 GB	32 GB
3D	8 (8)	15 (15)	35 (35)	70 (70)	145 (145)
	9 (9)	15 (15)	35 (35)	75 (75)	150 (150)
50p Quality PS	8 (8)	15 (15)	35 (35)	70 (70)	145 (145)
	9 (9)	15 (15)	35 (35)	75 (75)	150 (150)
Highest Quality FX	10 (10)	20 (20)	40 (40)	80 (80)	170 (170)
	10 (10)	20 (20)	40 (40)	90 (90)	180 (180)
High Quality FH	10 (10)	25 (25)	55 (55)	110 (110)	225 (225)
	10 (10)	30 (30)	60 (60)	120 (120)	245 (245)
Standard HQ	20 (15)	45 (35)	90 (70)	185 (145)	375 (295)
	25 (15)	50 (40)	105 (80)	215 (165)	440 (330)
Long Time LP	35 (30)	70 (60)	145 (125)	295 (255)	590 (510)
	45 (35)	90 (75)	190 (155)	380 (310)	770 (630)

- Top: When [**HD**: Audio Format] is set to [Linear PCM]
Bottom: When [**HD**: Audio Format] is set to [Dolby Digital]

Standard definition image quality (STD)

(unit: minute)

	2 GB	4 GB	8 GB	16 GB	32 GB
Standard HQ	25 (25)	55 (50)	110 (100)	225 (210)	460 (420)

Notes

- The recordable time may vary depending on the recording and subject conditions and [**REC** Mode] (p. 38), [**Frame Rate**] and [**Frame Rate**] (p. 38).
- The number in () is the minimum recordable time.


Expected number of recordable photos

Internal recording media

You can record the maximum 40,000 photos.

Memory card

	4:3 7.1M 7.1M
2 GB	560
4 GB	1100
8 GB	2250
16 GB	4550
32 GB	9200

- The selected image size is effective when the  (Photo) lamp is lit.
- The number of recordable photos of memory card shown is for the maximum image size of your camcorder. The actual number of recordable photos is displayed on the LCD screen during recording (p. 113).
- The number of recordable photos of memory card may vary depending on the recording conditions.

Notes

- The unique pixel array of Sony's ClearVid and the image processing system allow still image resolution equivalent to the sizes described.

Tips

- The following list shows the bit-rate, pixels and aspect ratio of each recording mode (movie + audio, etc.).
 - 3D Movie:
Max. 28 Mbps $1,920 \times 1,080$ pixels/16:9
 - High definition image quality (HD):
PS: Max. 28 Mbps $1,920 \times 1,080$ pixels/16:9
FX: Max. 24 Mbps $1,920 \times 1,080$ pixels/16:9
FH: Approx. 17 Mbps (average) $1,920 \times 1,080$ pixels/16:9
HQ: Approx. 9 Mbps (average) $1,440 \times 1,080$ pixels/16:9
LP: Approx. 5 Mbps (average) $1,440 \times 1,080$ pixels/16:9
 - Standard definition image quality (STD):
HQ: Approx. 9 Mbps (average) 720×576 pixels/16:9, 4:3
- The photo recording pixels and the aspect ratio.
 - Photo recording mode:
 $3,072 \times 2,304$ dots/4:3
 $3,072 \times 1,728$ dots/16:9
 $1,600 \times 1,200$ dots/4:3
 640×480 dots/4:3
 - Dual recording:
 $3,072 \times 1,728$ dots/16:9
 $2,304 \times 1,728$ dots/4:3
 - Capturing a photo from a movie:
 $1,920 \times 1,080$ dots/16:9
 640×360 dots/16:9
 640×480 dots/4:3

Using your camcorder abroad

Power supply

You can use your camcorder in any countries/regions using the AC Adaptor supplied with your camcorder within the AC 100 V to 240 V, 50 Hz/60 Hz range.

Viewing 3D movies

In countries/regions where 1080/50i is supported, you can view 3D movies as that of the recorded movies.

You need a PAL-system-based and 1080/50i compatible TV (or monitor) with component and AUDIO/VIDEO input jacks. The HDMI cable (supplied) or a component A/V cable (supplied) must be connected.

Viewing high definition image quality (HD) movies

In countries/regions where 1080/50i is supported, you can view the movies with the same high definition image quality (HD) as that of the recorded movies.

You need an PAL-system-based and 1080/50i compatible TV (or monitor) with component and AUDIO/VIDEO input jacks. The HDMI cable (supplied) or a component A/V cable (supplied) must be connected.

Viewing standard definition image quality (STD) movies

To view standard definition image quality (STD) movies, you need a PAL-system-based TV with AUDIO/VIDEO input jacks. An A/V connecting cable must be connected.

On TV color systems

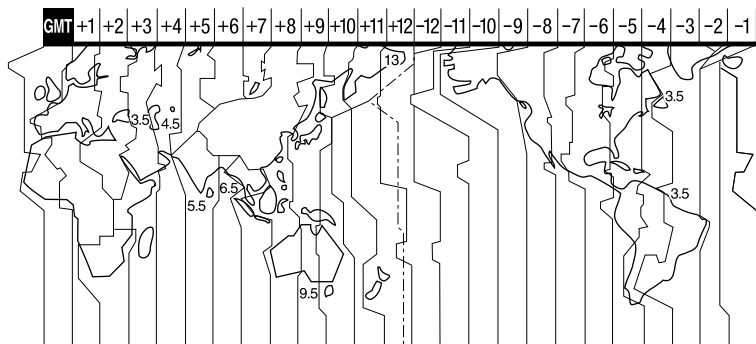
Your camcorder is a PAL-system-based camcorder. If you want to view the playback image on a TV, it must be a PAL-system-based TV with an AUDIO/VIDEO input jack.

System	Used in
PAL	Australia, Austria, Belgium, China, Czech Republic, Denmark, Finland, Germany, Holland, Hong Kong, Hungary, Italy, Kuwait, Malaysia, New Zealand, Norway, Poland, Portugal, Singapore, Slovak Republic, Spain, Sweden, Switzerland, Thailand, United Kingdom, etc.
PAL-M	Brazil
PAL-N	Argentina, Paraguay, Uruguay
NTSC	Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Guyana, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the USA, Venezuela, etc.
SECAM	Bulgaria, France, Guiana, Iran, Iraq, Monaco, Russia, Ukraine, etc.

Setting to the local time

You can easily set the clock to the local time by setting a time difference when using your camcorder abroad. Touch **MENU** (MENU) → [Setup] → [⌚ (Clock Settings)] → [Date & Time Setting] → [Summer Time] and **MENU** (MENU) → [Setup] → [⌚ (Clock Settings)] → [Area Setting] (p. 85).

World time difference

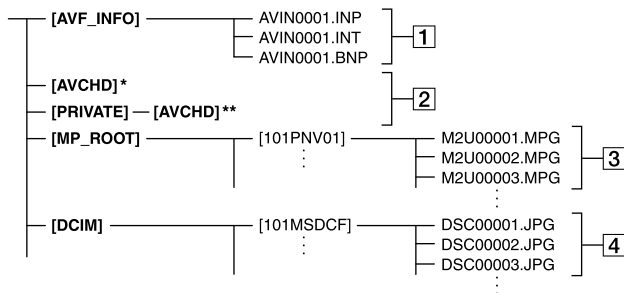


Time-zone differences	Area setting
GMT	Lisbon, London
+01:00	Berlin, Paris
+02:00	Helsinki, Cairo, Istanbul
+03:00	Moscow, Nairobi
+03:30	Tehran
+04:00	Abu Dhabi, Baku
+04:30	Kabul
+05:00	Karachi, Islamabad
+05:30	Calcutta, New Delhi
+06:00	Almaty, Dhaka
+06:30	Yangon
+07:00	Bangkok, Jakarta
+08:00	Hong Kong, Singapore, Beijing
+09:00	Seoul, Tokyo
+09:30	Adelaide, Darwin

Time-zone differences	Area setting
+10:00	Melbourne, Sydney
+11:00	Solomon Is
+12:00	Fiji, Wellington, Eniwetok, Kwajalein
-11:00	Samoa
-10:00	Hawaii
-09:00	Alaska
-08:00	Los Angeles, Tijuana
-07:00	Denver, Arizona
-06:00	Chicago, Mexico City
-05:00	New York, Bogota
-04:00	Santiago
-03:30	St. John's
-03:00	Brasilia, Montevideo
-02:00	Fernando de Noronha
-01:00	Azores, Cape Verde Is.

File/folder structure on the recording media

The file/folder structure is shown below. You do not usually need to acknowledge the file/folder structure, when recording/playing back movies and still images on the camcorder.



* "Memory Stick PRO Duo" media

** SD memory card, SDHC memory card, SDXC memory card

1 Image management files

When you delete the files, you cannot record/play back the images correctly. The files are defaulted as hidden files and not usually displayed.

2 HD movie management information folder

This folder contains recording data of high definition image quality (HD) movies. Do not try to open this folder or access the contents of this folder from a computer. Doing so might damage image files, or prevent image files from being played back.

3 STD movie files (MPEG-2 files)

The extension of the files is ".MPG". The maximum size is 2 GB. When the capacity of a file exceeds 2 GB, the file becomes divided. The file numbers go up automatically. When the capacity of a file number exceeds 9999, another folder is created to record new movie files.

The folder name goes up: [101PNV01] → [102PNV01]

4 Still image files (JPEG files)

The extension of the files is ".JPG". The file numbers go up automatically. When the capacity of a file number exceeds 9999, another folder is created to store new still image files.

The folder name goes up: [101MSDCF] → [102MSDCF]

- Do not modify the files or folders on the camcorder from the computer. The image files may be destroyed or may not be played back.
- Operation is not guaranteed, if you perform the above operation.
- When you delete image files, follow the steps on page 46. Do not delete the image files on the camcorder directly from the computer.
- Do not format the recording media using a computer. The camcorder may not operate correctly.
- Do not copy the files on the recording media from the computer. Operation is not guaranteed.
- Use the supplied application software "Content Management Utility" to input data from the recording media to a computer.

Maintenance and precautions

About the AVCHD format

What is the AVCHD format?

The AVCHD format is a high definition digital video camera format used to record a high definition (HD) signal using efficient data compression coding technology. The MPEG-4 AVC/H.264 format is adopted to compress video data, and the Dolby Digital or Linear PCM system is used to compress audio data.

The MPEG-4 AVC/H.264 format is capable of compressing images at higher efficiency than that of the conventional image compressing format.

- As the AVCHD format uses a compression coding technology, the picture may be disturbed in scenes where picture, field angles or brightness, etc. change drastically, but this is not a malfunction.

Recording and playback on your camcorder

Based on the AVCHD format, your camcorder records with the high definition image quality (HD).

In addition to high definition image quality (HD), your camcorder is capable of recording a standard definition (STD) signal in the conventional MPEG-2 format.

Video signal*: MPEG-4 AVC/H.264 1920 × 1080/50i, 1440 × 1080/50i, 1920 × 1080/25p

Audio signal: Linear PCM 2ch/Dolby Digital 2ch

Recording media:

Internal memory, memory card

- * Data recorded in AVCHD format other than the above mentioned cannot be played on your camcorder.

About the memory card

- A memory card formatted by a computer (Windows OS/Mac OS) does not have guaranteed compatibility with your camcorder.
- Data read/write speed may vary depending on the combination of the memory card and memory card compliant product you use.
- Damaged or lost data may occur in the following cases (the data will not be compensated for):
 - If you eject the memory card, or turn off your camcorder while your camcorder is reading or writing image files on the memory card (while the access lamp is lit or flashing)
 - If you use the memory card near magnets or magnetic fields
- It is recommended that you make a back-up of important data on the hard disk of a computer.
- Do not attach a label or the like on memory card or memory card adaptor.
- Do not touch, or allow metallic objects to come into contact with the terminals.
- Do not bend, drop or apply strong force to the memory card.
- Do not disassemble or modify the memory card.
- Do not let the memory card get wet.
- Keep the memory card out of the reach of small children. There is danger that a child might swallow it.
- Do not insert anything other than the compliant size of memory card into the memory card slot. Doing so may cause a malfunction.
- Do not use or keep the memory card in the following locations:
 - Places subject to extremely high temperature, such as a car parked outside in the summer
 - Places under direct sunlight
 - Places with extremely high humidity or subject to corrosive gases

On the memory card adaptor

- When using memory card with memory card compliant device inserting memory card into memory card adaptor, make sure the memory card is inserted facing in the correct direction. Note that improper use may cause a malfunction.

On image data compatibility

- Image data files recorded on memory card by your camcorder conform to the "Design rule for Camera File system" universal standard established by the JEITA (Japan Electronics and Information Technology Industries Association).
- On your camcorder, you cannot play back photos recorded on other devices (DCR-TRV900E or DSC-D700/D770) that do not conform to the universal standard. (These models are not sold in some regions.)
- If you cannot use memory cards that have been used with another device, format it with your camcorder (p. 80). Note that formatting erases all information on the memory card.
- You may not be able to play back images with your camcorder:
 - When playing back image data modified on your computer
 - When playing back image data recorded with other devices


About the "Memory Stick" media

Types of "Memory Stick" media	Recording/Playback
"Memory Stick Duo" media (with MagicGate)	—
"Memory Stick PRO Duo" media (Mark2)	✓
"Memory Stick PRO-HG Duo" media	✓

- This product supports parallel data transfer. However, the transfer speed may differ, depending on the type of media you use.

- This product cannot record or play data that uses "MagicGate" technology. "MagicGate" is a copyright protection technology that records and transfers the contents in an encrypted format.

About the "InfoLITHIUM" battery pack

Your camcorder operates only with an "InfoLITHIUM" V series battery packs. "InfoLITHIUM" V series battery packs have the  mark.

What is an "InfoLITHIUM" battery pack?

- An "InfoLITHIUM" battery pack is a lithium-ion battery pack that has functions for communicating information related to operating conditions between your camcorder and an AC Adaptor/charger (sold separately).
- The "InfoLITHIUM" battery pack calculates the power consumption according to the operating conditions of your camcorder, and displays the remaining battery time in minutes.
- The battery pack NP-FV70 is compatible with "ActiFORCE." "ActiFORCE" is a new generation power system. Battery capacity, boost charge, and the speed and accuracy of battery time remaining calculations have been improved when compared with current "InfoLITHIUM" P-series battery.


To charge the battery pack

- Be sure to charge the battery pack before you start using your camcorder.
- We recommend charging the battery pack in an ambient temperature of from 10 °C to 30 °C (50 °F to 86 °F) until the CHG (charge) lamp turns off. If you charge the battery pack outside of this temperature range, you may not be able to charge it efficiently.


To use the battery pack effectively

- Battery pack performance decreases when the ambient temperature is 10 °C (50 °F) or below, and the length of time you can use the battery pack becomes shorter. In that case, do one of the following to use the battery pack for a longer time.
 - Put the battery pack in a pocket to warm it up, and install it on your camcorder right before you start taking shots.
 - Use a large capacity battery pack: NP-FV100 (sold separately).
- Frequent use of the LCD screen or a frequent playback, fast forward or reverse operation wears out the battery pack faster. We recommend using a large capacity battery pack: NP-FV100 (sold separately).
- Be sure to close the LCD screen when not recording or playing back on your camcorder. The battery pack is also consumed when your camcorder is in recording standby or playback pause.
- Have spare battery packs ready for 2 or 3 times the expected recording time, and make trial recordings before making the actual recording.
- Do not expose the battery pack to water. The battery pack is not water resistant.

About the remaining battery time indicator

- When the power goes off even though the remaining battery time indicator indicates that the battery pack has enough power to operate, charge the battery pack fully again. Remaining battery time will be indicated correctly. Note, however, that the battery indication will not be restored if it is used in high temperatures for a long time, or if left in a fully charged state, or when the battery pack is frequently used. Use the remaining battery time indication as a rough guide only.
- The  mark that indicates low battery flashes even if there are still 20 minutes of battery time remaining, depending on the operating conditions or ambient temperature.

About storage of the battery pack

- If the battery pack is not used for a long time, fully charge the battery pack and use it up on your camcorder once a year to maintain proper function. To store the battery pack, remove it from your camcorder and put it in a dry, cool place.
- To discharge the battery pack on your camcorder completely, touch **MENU** (MENU) → [Setup] → [ General Settings]] → [A. Shut Off] → [Off], and leave your camcorder in recording standby until the power goes off (p. 85).

About battery life

- Battery capacity decreases over time and through repeated use. If decreased usage time between charges becomes significant, it is probably time to replace it with a new one.
- Each battery's life is governed by storage, operating and environmental conditions.

About x.v.Color

- x.v.Color is a more familiar term for the xvYCC standard proposed by Sony, and is a trademark of Sony.
- xvYCC is an international standard for color space in video. This standard can express a wider color range than the currently used broadcast standard.

About handling of your camcorder

On use and care

- Do not use or store the camcorder and accessories in the following locations:
 - Anywhere extremely hot, cold or humid. Never leave them exposed to temperatures above 60 °C (140 °F), such as under direct sunlight, near heaters or in a car parked in the sun. They may malfunction or become deformed.
 - Near strong magnetic fields or mechanical vibration. The camcorder may malfunction.
 - Near strong radio waves or radiation. The camcorder may not be able to record properly.

- Near AM receivers and video equipment. Noise may occur.
- On a sandy beach or anywhere dusty. If sand or dust gets in your camcorder, it may malfunction. Sometimes this malfunction cannot be repaired.
- Near windows or outdoors, where the LCD screen, or the lens may be exposed to direct sunlight. This damages the LCD screen.
- Operate your camcorder on DC 6.8 V/7.2 V (battery pack) or DC 8.4 V (AC Adaptor).
- For DC or AC operation, use the accessories recommended in these operating instructions.
- Do not let your camcorder get wet, for example, from rain or sea water. If your camcorder gets wet, it may malfunction. Sometimes this malfunction cannot be repaired.
- If any solid object or liquid gets inside the casing, unplug your camcorder and have it checked by a Sony dealer before operating it any further.
- Avoid rough handling, disassembling, modifying, physical shock, or impact such as hammering, dropping or stepping on the product. Be particularly careful of the lens.
- Keep the LCD screen closed when you are not using your camcorder.
- Do not wrap your camcorder with a towel, for example, and operate it. Doing so might cause heat to build up inside.
- When disconnecting the power cord (mains lead), pull it by the plug and not the cord.
- Do not damage the power cord (mains lead) such as by placing anything heavy on it.
- Do not use a deformed or damaged battery pack.
- Keep metal contacts clean.
- If the battery electrolytic liquid has leaked:
 - Consult your local authorized Sony service facility.
 - Wash off any liquid that may have contacted your skin.
 - If any liquid gets in your eyes, wash with plenty of water and consult a doctor.

When not using your camcorder for a long time

- To keep your camcorder in optimum state for a long time, turn it on and let it run by recording and playing back images about once a month.
- Use up the battery pack completely before storing it.

Moisture condensation

If your camcorder is brought directly from a cold place to a warm place, moisture may condense inside your camcorder. This may cause a malfunction to your camcorder.

- If moisture condensation has occurred
 - Leave your camcorder for about 1 hour without turning it on.
- Note on moisture condensation
 - Moisture may condense when you bring your camcorder from a cold place into a warm place (or vice versa) or when you use your camcorder in a humid place as follows:
 - You bring your camcorder from a ski slope into a place warmed up by a heating device.
 - You bring your camcorder from an air conditioned car or room into a hot place outside.
 - You use your camcorder after a squall or a shower.
 - You use your camcorder in a hot and humid place.
- How to prevent moisture condensation
 - When you bring your camcorder from a cold place into a warm place, put your camcorder in a plastic bag and seal it tightly. Remove the bag when the air temperature inside the plastic bag has reached the surrounding temperature (after about 1 hour).

LCD screen

- Do not exert excessive pressure on the LCD screen, as it may cause uneven color and other damage.
- If your camcorder is used in a cold place, a residual image may appear on the LCD screen. This is not a malfunction.
- While using your camcorder, the back of the LCD screen may heat up. This is not a malfunction.

To clean the LCD screen

- The surface of the LCD screen is coated. If you scratch the surface, the coating may be come off. Mind the following points when cleaning and handling it.
 - Use a soft cloth (a cloth for glasses, etc.) gently to clean the dirt.
 - Remove the dust or sand with a blower, etc. before wiping the dirt.
 - The coating may be scratched if you wipe the screen with a tissue, etc.
 - If hand grease or hand cream remains on the screen, the coating comes off more easily. Wipe it early.

On handling the casing

- If the casing is soiled, clean the camcorder body with a soft cloth lightly moistened with water, and then wipe the casing with a dry soft cloth.
- Avoid the following to avoid damage to the finish:
 - Using chemicals such as thinner, benzene, alcohol, chemical cloths, repellent, insecticide and sunscreen
 - Handling the camcorder with above substances on your hands
 - Leaving the casing in contact with rubber or vinyl objects for a long period of time

About care and storage of the lens

- Wipe the surface of the lens clean with a soft cloth in the following instances:
 - When there are fingerprints on the lens surface
 - In hot or humid locations
 - When the lens is exposed to salty air such as at the seaside
- It is recommended that you use [Auto 3D Lens Adjust] (p. 71) after wiping the lens.
- Store in a well-ventilated location subject to little dirt or dust.
- To prevent mold, periodically clean the lens as described above.

On charging the pre-installed rechargeable battery

Your camcorder has a pre-installed rechargeable battery to retain the date, time, and other settings even when the LCD screen is closed. The pre-installed rechargeable battery is always charged while your camcorder is connected to the wall outlet (wall socket) via the AC Adaptor or while the battery pack is attached. The rechargeable battery will be fully discharged in about 3 months if you do not use your camcorder at all. Use your camcorder after charging the pre-installed rechargeable battery.

However, even if the pre-installed rechargeable battery is not charged, the camcorder operation will not be affected as long as you are not recording the date.

How to charge the pre-installed rechargeable battery

Connect your camcorder to a wall outlet (wall socket) using the supplied AC Adaptor, and leave it with the LCD screen closed for more than 24 hours.

Note on disposal/transfer of the camcorder

Even if you delete all movies and still images, or perform [Format] (p. 80), data on the internal recording media may not be completely erased. When you transfer the camcorder, it is recommended that you perform [Empty] (p. 81) to prevent the recovery of your data. Also, when you dispose of the camcorder, it is recommended that you destroy the actual body of the camcorder.

Specifications

Note on disposal/transfer of the memory card

Even if you delete data in the memory card or format the memory card on your camcorder or a computer, you may not delete data from the memory card completely. When you give the memory card to somebody, it is recommended that you delete data completely using data deletion software on a computer. Also, when you dispose of the memory card, it is recommended that you destroy the actual body of the memory card.

System

Signal format:

NTSC color, EIA standards
HDTV 1080/60i, 1080/60p specification
PAL color, CCIR standards
HDTV 1080/50i, 1080/50p specification

Movie recording format:

HD:
3D: MVC (original format)
2D: MPEG-4 AVC/H.264 AVCHD format compatible (1080/60p, 1080/50p original format)
STD: MPEG2-PS

Audio recording system:

Linear PCM 2ch (48 kHz 16-bit)
Dolby Digital 2ch (48 kHz 16-bit)
Dolby Digital Stereo Creator employed

Photo file format

DCF Ver.2.0 Compatible
Exif Ver.2.3 Compatible
MPF Baseline Compatible

Recording media (Movie/Photo)

Internal memory
96 GB
“Memory Stick PRO Duo” media
SD card (Class 4 or faster)

When measuring media capacity, 1 GB equals 1 billion bytes, a portion of which is used for system management and/or application files. The capacity that a user can use is approximately 96 GB.

Image device:

4.5 mm (1/4 type) CMOS sensor
Recording pixels (photo, 4:3):
Max. 7.1 mega (3 072 × 2 304) pixels*1
Gross: Approx. 4 200 000 pixels
Effective (movie, 16:9)*2:
3D: Approx. 1 990 000 pixels
2D: Approx. 2 650 000 pixels
Effective (photo, 16:9):
Approx. 2 650 000 pixels
Effective (photo, 4:3):
Approx. 3 540 000 pixels

Lens: G lens

3D: 10 × (Optical)
2D: 12 × (Optical)*2, 17 × (Extended)*3, 160 × (Digital)
F1.8 – F3.4
f=2.9 mm – 34.8 mm (1/8 in. – 1 3/8 in.)
When converted to a 35 mm still camera
Movie*2:
3D: 34.4 mm – 344 mm (1 3/8 in. – 13 9/16 in.)

2D: 29.8 mm – 357.6 mm (1 3/16 in.

– 14 1/8 in.) (16:9)

Photo:

27.4 mm – 328.8 mm (1 1/8 in. – 13 in.) (4:3)


Color temperature: [Auto], [One Push], [Indoor]
(3 200 K), [Outdoor] (5 800 K)


Minimum illumination

11 lx (lux) (in default setting, shutter speed
1/60*⁴, 1/50*⁵ second)

3 lx (lux) ([Low Lux] is set to [On], shutter
speed 1/30*⁴, 1/25*⁵ second)

*¹ The unique pixel array of Sony's ClearVid
and the image processing system allow
still image resolution equivalent to the
sizes described.

*² [ SteadyShot] is set to [Standard] or
[Off] .

*³ [ SteadyShot] is set to [Active].

*⁴ [60i/50i Sel] is set to [60i].

*⁵ [60i/50i Sel] is set to [50i].

Input/Output connectors

A/V Remote Connector: Component/video and
audio output jack

HDMI jack: HDMI mini connector

USB jack: mini-AB

Headphone jack: Stereo minijack (φ 3.5 mm)

MIC input jack: Stereo minijack (φ 3.5 mm)

INPUT1/INPUT2 jack: XLR3-pin, female

MIC: -60 dBu /-50 dBu /-40 dBu, 3 kΩ
(kilohms)

LINE: +4 dBu, 10 kΩ (kilohms)

(0 dBu=0.775 Vrms)

LCD screen

Picture: 8.8 cm (3.5 type, aspect ratio 16:9)

Total number of pixels: 1 229 760 (2 562 × 480)

General

Power requirements: DC 6.8 V/7.2 V (battery
pack) DC 8.4 V (AC Adaptor)

Average power consumption:

During camera recording using the
microphone (ECM-XM1), the LCD screen at
normal brightness:

HD: 3D: 5.4 W, 2D: 4.0 W

STD: 3.6 W

Operating temperature: 0 °C to 40 °C (32 °F to
104 °F)

Storage temperature: -20 °C to +60 °C (-4 °F to
+140 °F)

Dimensions (approx.):

86.5 mm × 79 mm × 148.5 mm (3 1/2 in. ×
3 1/8 in. × 5 7/8 in.) (w/h/d) including the
projecting parts

124.5 mm × 165.5 mm × 262.5 mm (5 in. ×
6 5/8 in. × 10 3/8 in.) (w/h/d) including the
projecting parts, the supplied lens hood, XLR
Adaptor, and the microphone (ECM-XM1)

Mass (approx.)

650 g (1 lb 6.9 oz) main unit only

1 150 g (2 lb 8.6 oz) including the supplied
lens hood, battery (NP-FV70), XLR Adaptor,
and the microphone (ECM-XM1)

AC Adaptor AC-L200C/AC-L200D

Power requirements: AC 100 V - 240 V,
50 Hz/60 Hz

Current consumption: 0.35 A - 0.18 A

Power consumption: 18 W

Output voltage: DC 8.4 V*

Operating temperature: 0 °C to 40 °C (32 °F to
104 °F)

Storage temperature: -20 °C to +60 °C (-4 °F to
+140 °F)

Dimensions (approx.): 48 mm × 29 mm × 81 mm
(1 15/16 in. × 1 3/16 in. × 3 1/4 in.) (w/h/d)
excluding the projecting parts

Mass (approx.): 170 g (6.0 oz) excluding the
power cord (mains lead)

* See the label on the AC Adaptor for other
specifications.

Rechargeable battery pack NP-FV70

Maximum output voltage: DC 8.4 V

Output voltage: DC 6.8 V

Maximum charge voltage: DC 8.4 V

Maximum charge current: 3.0 A

Capacity

Typical: 14.0 Wh (2 060 mAh)



Minimum: 13.0 Wh (1 960 mAh)

Type: Li-ion

Design and specifications of your camcorder and
accessories are subject to change without notice.

• Manufactured under license from Dolby
Laboratories.

On trademarks

- “NXCAM” logo is a trademark of Sony Corporation.
- “AVCHD” and “AVCHD” logotype are trademarks of Panasonic Corporation and Sony Corporation.
- “Memory Stick,”  “Memory Stick Duo,” “**MEMORY STICK DUO**,” “Memory Stick PRO Duo,” “**MEMORY STICK PRO DUO**,” “Memory Stick PRO-HG Duo,” “**MEMORY STICK PRO-HG DUO**,” “MagicGate,” “**MAGICGATE**,” “MagicGate Memory Stick” and “MagicGate Memory Stick Duo” are trademarks or registered trademarks of Sony Corporation.
- “InfoLITHIUM” is a trademark of Sony Corporation.
- “x.v.Colour” is a trademark of Sony Corporation.
- **S-master** is a registered trademark of Sony Corporation.
- “BRAVIA” is a trademark of Sony Corporation.
- “DVDirect” is a trademark of Sony Corporation.
- Blu-ray Disc™ and Blu-ray™ are trademarks of the Blu-ray Disc Association.
- Dolby and the double-D symbol are trademarks of Dolby Laboratories.
- HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.
- Microsoft, Windows, Windows Vista, and DirectX are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Macintosh and Mac OS are registered trademarks of Apple Inc. in the U.S. and other countries.
- Intel, Intel Core, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
- “” and “PlayStation” are registered trademarks of Sony Computer Entertainment Inc..
- Adobe, the Adobe logo, and Adobe Acrobat are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.
- SDXC logo is a trademark of SD-3C, LLC.

- MultiMediaCard is a trademark of MultiMediaCard Association.

All other product names mentioned herein may be the trademarks or registered trademarks of their respective companies. Furthermore, ™ and ® are not mentioned in each case in this Handbook.

Notes on the License

ANY USE OF THIS PRODUCT OTHER THAN CONSUMER PERSONAL USE IN ANY MANNER THAT COMPLIES WITH THE MPEG-2 STANDARD FOR ENCODING VIDEO INFORMATION FOR PACKAGED MEDIA IS EXPRESSLY PROHIBITED WITHOUT A LICENSE UNDER APPLICABLE PATENTS IN THE MPEG-2 PATENT PORTFOLIO, WHICH LICENSE IS AVAILABLE FROM MPEG LA, L.L.C., 250 STEELE STREET, SUITE 300, DENVER, COLORADO 80206.

THIS PRODUCT IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL AND NON-COMMERCIAL USE OF A CONSUMER TO

- ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD (“AVC VIDEO”) AND/OR
 - DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL AND NON-COMMERCIAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO.
- NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE <[HTTP://WWW.MPEGLA.COM](http://WWW.MPEGLA.COM)>

“C Library,” “zlib,” and “libjpeg” software are provided in your camcorder. We provide this software based on license agreements with their owners of copyright. Based on requests by the owners of copyright of these software applications, we have an obligation to inform you of the following. Please read the following sections.

Read “license3.pdf” in the “License” folder on the CD-ROM. You will find licenses (in English) of “C Library,” “zlib,” and “libjpeg” software.

On GNU GPL/LGPL applied software

The software that is eligible for the following GNU General Public License (hereinafter referred to as “GPL”) or GNU Lesser General Public License (hereinafter referred to as “LGPL”) are included in the camcorder.

This informs you that you have a right to have access to, modify, and redistribute source code for these software programs under the conditions of the supplied GPL/LGPL.

Source code is provided on the web. Use the following URL to download it. When downloading the source code, select NEX-FS100 as the model for your camcorder.

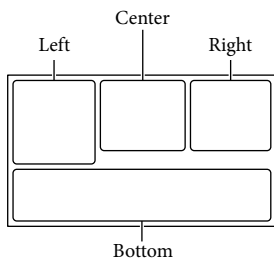
<http://www.sony.net/Products/Linux/>

We would prefer you do not contact us about the contents of source code.

Read “license2.pdf” in the “License” folder on the CD-ROM. You will find licenses (in English) of “GPL,” and “LGPL” software.

To view the PDF, Adobe Reader is needed. If it is not installed on your computer, you can download it from the Adobe Systems web page: <http://www.adobe.com/>

Screen indicators



Left

Indicator	Meaning
	MENU button (62)
	Self-timer recording (73)
	Wide Mode (77)
	Fader (72)
	[Face Detection] set to [Off] (74)
	[Smile Shutter] set to [Off] (75)
	Manual focus (70)
	Scene Selection (72)
	White Balance (68)
	SteadyShot off (73)
	Tele Macro (73)
	x.v.Color (78)
	Intelligent Auto (37)
Multi ch	Multichannel audio (92)
	While playing Left image / Right image

Center

Indicator	Meaning
[STBY]/[REC]	Recording status (24)
	Slide show set
	Warning (94)
	HDMI
	Playback mode (30)

Right

Indicator	Meaning
	Recording image quality (HD/STD), frame rate (50p/50i/25p) and recording mode (PS/FX/FH/HQ/LP) (38)
60min	Remaining battery
	Recording/playback/editing media (20)
	The external media device is connected.
00:00:00.00	Time code (hour:minute:second.frame)/user bit (42)
00h00m	Estimated recording remaining time
	Photo size (78)
9999	Approximate number of recordable photos and photo size
101	Playback folder
100/112	Current playing movie or photo/Number of total recorded movies or photos
2D 3D	2D/3D record or playback

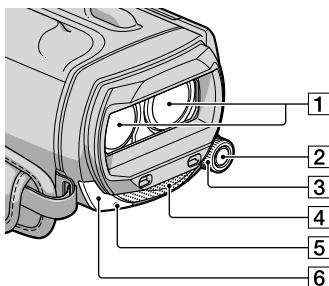
Parts and controls

Bottom

Indicator	Meaning
	View Images button (28)
	Micref Level low (76)
	Blt-in Zoom Mic (75)
	Audio Level Display (77)
	Low Lux (71)
	Spot Meter/Fcs (69)/ Spot Meter (69)/ Exposure (70)
EV	AE Shift (71)
10000	Shutter Speed (70)
F1.4	IRIS (70)
	Intelligent Auto (37)
	Slide show button
101-0005	Data file name (31)
	Protected image (47)
	Audio Format (77)
	3D Depth Adjustment (30)
AUTO	Automatic (42)
MANUAL	Exposure is set manually. (42)
AE A	IRIS priority (42)
AES	Shutter speed priority (42)

- Indicators and their positions are approximate and may differ from what you actually see.
- Some indicators may not appear, depending on your camcorder model.

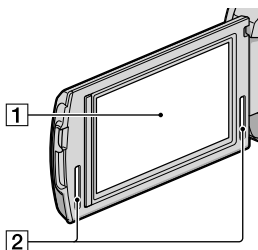
Figures in () are reference pages.



- 1 Lens (G lens)
- 2 MANUAL button (40)
- 3 MANUAL dial (40)
- 4 Built-in microphone (43)
- 5 Camera recording lamp (85)

The camera recording lamp lights up in red during recording. The lamp flashes when the remaining recording media capacity or battery power is low.

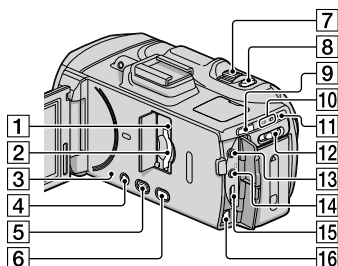
- 6 Remote sensor
Point the Wireless Remote Commander (p. 118) towards the remote sensor to operate your camcorder.



1 LCD screen/Touch panel (16, 40)

If you rotate the LCD panel 180 degrees, you can close the LCD panel with the LCD screen facing out. This is convenient during playback operations.

2 Stereo speakers



1 Memory card access lamp (22)

While the lamp is lit or flashing, the camcorder is reading or writing data.

2 Memory card slot (22)

3 RESET button

Press RESET using a pointed object.

Press RESET to initialize all the settings including the clock setting.

4 POWER button (16)

5  (View Images) button (28)

6 2D/3D DISP (display) button (24)

7 Power zoom lever (36)

8 PHOTO button (27)

9 MODE button (24)

10  (Movie)/ (Photo) lamps (24)

11 CHG (charge) lamp (13)

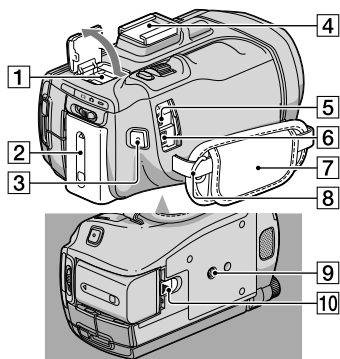
12 2D/3D switch (24)

13 MIC (PLUG IN POWER) jack

14  (headphones) jack

15 HDMI OUT jack (32)

16 A/V Remote Connector (32)



5 Ψ (USB) jack (53)

6 DC IN jack (13)

7 Grip belt (23)

8 Hook for a shoulder belt

9 Tripod receptacle

Attach a tripod (sold separately) to the tripod receptacle using a tripod screw (sold separately; the length of the screw must be less than 5.5 mm (7/32 in.)).

10 BATT (battery) release lever (14)

1 Active Interface Shoe



The Active Interface Shoe supplies power to accessories such as a video light, a flash, or a microphone (sold separately). The accessory can be turned on or off as you open or close the LCD screen of your camcorder. Refer to the operating instructions supplied with your accessory for details.

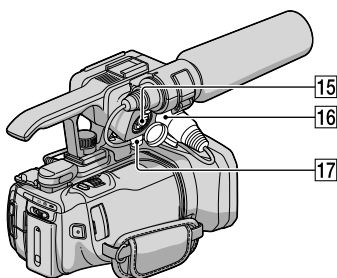
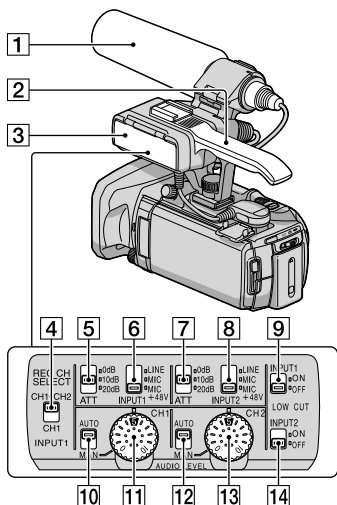
The Active Interface Shoe has a safety device for fixing the installed accessory securely. To connect an accessory, press down and push it to the end, and then tighten the screw. To remove an accessory, loosen the screw, and then press down and pull out the accessory.

- When you open the shoe cover, slide it as indicated by the arrow.
- When you are recording movies with an external flash (sold separately) connected to the accessory shoe, turn off the power of the external flash to prevent charging noise being recorded.
- When an external microphone (sold separately) is connected, it takes precedence over the built-in microphone (p. 43).

2 Battery pack (13)

3 START/STOP button (24)

4 Accessory Shoe (9)



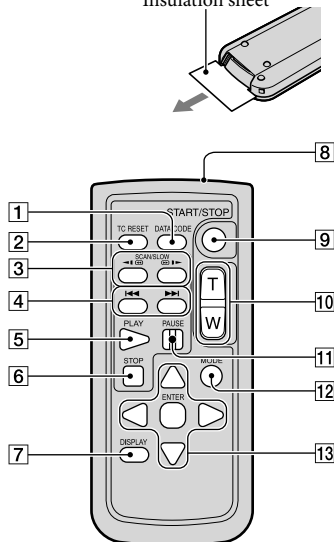
- 10 AUTO/MAN (CH1) switch (44)
- 11 AUDIO LEVEL (CH1) dial (44)
- 12 AUTO/MAN (CH2) switch (44)
- 13 AUDIO LEVEL (CH2) dial (44)
- 14 LOW CUT (INPUT2) switch (44)
- 15 INPUT2 jack (44)
- 16 INPUT1 jack (44)
- 17 Cable holder (11)

- 1 Microphone (10)
- 2 Handgrip
- 3 XLR Adaptor (9)
- 4 REC CH SELECT (INPUT1) switch (44)
- 5 ATT (INPUT1) switch (44)
- 6 INPUT1 (LINE/MIC/MIC+48V) switch (44)
- 7 ATT (INPUT2) switch (44)
- 8 INPUT2 (LINE/MIC/MIC+48V) switch (44)
- 9 LOW CUT (INPUT1) switch (44)

Wireless Remote Commander

Remove the insulation sheet before using the Wireless Remote Commander.

Insulation sheet



- 1 DATA CODE button (81)
- 2 TC RESET button (42)
- 3 SCAN/SLOW buttons (30)
- 4 ◀◀/▶▶ (Previous/Next) buttons (30)
- 5 PLAY button
- 6 STOP button
- 7 DISPLAY button (25)
- 8 Transmitter
- 9 START/STOP button (24)
- 10 Power zoom buttons
- 11 PAUSE button
- 12 MODE button (28)

Displays an Index screen during playback.

13 ◀/▶/▲/▼/ENTER buttons

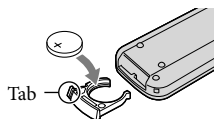
When you press any of these buttons, the light blue frame appears on the LCD screen. Select a desired button or an item with ◀/▶/▲/▼, then press ENTER to enter.

Notes

- Aim the Wireless Remote Commander towards the remote sensor to operate your camcorder (p. 114).
- Point the remote sensor away from strong light sources such as direct sunlight or overhead lighting. Otherwise, the Wireless Remote Commander may not function properly.
- When you are operating with the Wireless Remote Commander supplied with your camcorder, your video device may also operate. In that case, select a commander mode other than DVD2 for your video device, or cover the sensor of your video device with black paper.

To change the battery of the Wireless Remote Commander

- ① While pressing on the tab, inset your fingernail into the slit to pull out the battery case.
- ② Place a new battery with the + side facing up.
- ③ Insert the battery case back into the Wireless Remote Commander until it clicks.



WARNING

Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire.

- When the lithium battery becomes weak, the operating distance of the Wireless Remote Commander may shorten, or the Wireless Remote Commander may not function properly. In this case, replace the battery with a Sony CR2025 lithium battery. Use of another battery may present a risk of fire or explosion.

Index

Symbols

1080i/576i	83
1080p/576i	83
2D Frame Rate	77
3D Depth Adjustment	30
3D Frame Rate	77
576i	83
60i/50i Sel	84

A

A. Shut Off	85
A/V connecting cable	33, 58
Abroad	101
Active Interface Shoe	116
AE Shift	71
Area Setting	86
Audio Format	77
Audio Level Display	77
Audio Output Timing	76
Auto 3D Lens Adjust	17, 71
Auto Back Light	74
AVCHD format	104

B

Battery Info	85
Battery of the Wireless Remote Commander	118
Battery pack	13
Beach	72
Beep	84
Black Fader	72
Blt-in Zoom Mic	75
"BRAVIA" Sync	34

C

Camera/Mic	68
Camera Data	81
Capturing photos from a movie	50
Charging the battery pack	13
Charging the battery pack abroad	15, 101
Clock Set	17
Component	83
Connection	32

Content Management Utility	59
Copy	48

D

Data Code	19, 81
Date/Time	19
Date & Time Setting	85
Delete	46
Dial Setting	40, 74
Digital Zoom	74
Disc recorder	57
Display Setting	76
Divide	49
Dolby Digital	77
Dual Rec	40
DVD writer	56

E

Edit/Copy	80
Empty	81
Event Index	28
Event View	28
Exposure	70
External media	53

F

Face Detection	74
Fader	72
FH	38
File Number	81
Fireworks	72
Focus	70
Format	80
Frame Packing	83
Frame rate	38
Fully charged	13
FX	38

G

Golf Shot	67
Guide Frame	76

H

HD/STD Set	37
HD/STD Setting	77
HDMI 3D Setting	83

HDMI Output Link	83
HDMI Resolution	83
HDMI TC Output	84
HQ	38

I

Image quality	37
Image Quality/Size	77
Image Size	78
Indoor	68
"InfoLITHIUM" battery pack	105
Intelligent Auto	37
Internal microphone	43
IRIS	70

L

Landscape	72
Language Setting	19, 85
LCD Brightness	84
Lens hood	11
Linear PCM	77
Low Lux	71
LP	38

M

Maintenance	104
MANUAL dial	40
Media Info	80
Media Select	20
Media Settings	20
Memory card	21
"Memory Stick" media	21, 104
"Memory Stick PRO-HG Duo" media	21
"Memory Stick PRO Duo" media	21
Menus	63
Micref Level	76
Microphone	10
Mirror mode	40
Moisture condensation	107
Movies	24, 30
MPEG-4 AVC/H.264	104

O

One Push	68
Original	48
Outdoor	68

P

PAL	101
Photo Capture	50
Photos	27, 31
Playing	28
Portrait	72
Power on	16
Power On By LCD	85
Precautions	104
Protect	47
PS	38

R

REC Lamp	85
REC Mode	77
Rec Mode	38
Recording	23
Recording and playback time	97
Recording media	20
Recording time of movies/ number of recordable photos	97
Remote Ctrl	85
Repair	87
Repair Img. DB F	92, 94, 96
RESET	115

S

Saving images in external media	53
Scene Selection	72
Screen indicators	113
Self-diagnosis display/Warning indicators	94
Self-Timer	73
Setting the date and time	16
Setup	80
Shooting Mode	67
Shutter Speed	41, 70
Side-by-Side	83
Smile Sensitivity	75

Smile Shutter	75
Smth Slw REC	67
Snow	72
Specifications	109
Spot Focus	69
Spotlight	72
Spot Meter	69
Spot Meter/Fcs	69
SteadyShot (Movie)	73
SteadyShot (Photo)	74
SummerTime	86
Sunrise&Sunset	72
Supplied items	2

T

TC/UB	79
TC/UB Disp	79
TC Make	79
TC Preset	79
TC Run	79
Tele Macro	73
Telephoto	36
Thumbnail	47
Time data	42
Tripod	116
Troubleshooting	87
Turning the power on	16
TV	32
TV color systems	101
TV Type	82
Twilight	72

U

UB Preset	79
UB Time Rec	79
USB cable	56
USB CONNECT	56
USB Connect	84

V

VBR	99
Volume	82

W

Wall outlet (wall socket)	13
Warning messages	95
White Balance	68
White Balance Shift	71
White Fader	72
Wide angle	36
Wide Mode	77
Wind Noise Reduct.	75

X

x.v.Color	78, 106
XLR Adaptor	9

Z

Zoom	36
------------	----

<http://www.sony.net/>

Printed in Japan

© 2011 Sony Corporation



4278517110